

Late popliteal artery pseudoaneurysm mimicking deep vein thrombosis: Two case reports

Derin ven trombozunu taklit eden gecikmiş popliteal arter psödoanevrizması: İki olgu sunumu

Mehmet Atay¹, Onur Saydam¹, Mete Gürsoy², Vedat Bakuy³, Hacer Bal⁴

¹Department of Cardiovascular Surgery, Karaman State Hospital, Karaman, Turkey

²Department of Cardiovascular Surgery, International Hospital, İstanbul, Turkey

³Department of Cardiovascular Surgery, Bakırköy Dr. Sadi Konuk Training and Research Hospital, İstanbul, Turkey

⁴Department of Radiology, Karaman State Hospital, Karaman, Turkey

ABSTRACT

Popliteal artery pseudoaneurysm (PAP) is a rare condition. They are clinically characterized by pain and swelling. Deep vein thrombosis should be considered in the differential diagnosis. Herein, we presented two cases who were admitted to our clinic with pain and swelling in left their lower extremities late following orthopedic knee surgery. Both patients had a positive Homans' sign on physical examination. Color Doppler ultrasound, which was performed due to suspected deep vein thrombosis, revealed a giant pseudoaneurysm in the popliteal arteries in both patients.

Keywords: Lower limb; peripheral artery disease; surgical repair.

ÖZ

Popliteal arter psödoanevrizması (PAP) nadir bir durumdur. Klinik olarak ağrı ve şişlik ile karakterizedir. Ayırıcı tanıda derin ven trombozu akla gelmelidir. Bu yazıda, ortopedik diz cerrahisi sonrasında geç dönemde sol bacağına ağrı ve şişlik ile kliniğimize başvuran iki olgu sunuldu. Her iki hastanın fizik muayenesinde de Homans bulgusu pozitif idi. Derin ven trombozu şüphesi nedeniyle yapılan renkli Doppler ultrasonunda her iki hastanın popliteal arterlerinde dev bir psödoanevrizma tespit edildi.

Anahtar sözcükler: Alt ekstremitte; periferik arter hastalığı; cerrahi tamir.

Popliteal artery pseudoaneurysms (PAP) are caused by blunt or penetrating trauma, previous surgery of the popliteal artery, infection, and bone tumors such as osteochondromas. Among all popliteal artery aneurysms, pseudoaneurysms account for only 0-3.5%.^[1,2] Herein, we present two cases admitted to our clinic with pain and swelling in their left lower extremities following orthopedic surgery. Physical examination of both patients revealed positive Homans' sign. Color Doppler ultrasound (CDU) showed a giant pseudoaneurysm originating from the

popliteal artery in the left lower extremity in both patients.

CASE REPORT

Case 1- A 60-year-old female patient had the complaint of swelling and pain in her left lower extremity during daily activities. Her complaints started one week before admission to the hospital. Her physical examination revealed positive distal pulses, swelling on her left lower extremity below the

Received: October 21, 2015 **Accepted:** January 22, 2016

Correspondence: Mehmet Atay, MD. Karaman Devlet Hastanesi Kalp ve Damar Cerrahisi Kliniği, 70200 Karaman, Turkey.
e-mail: meatay@yahoo.com

Citation:

Atay M, Saydam O, Gürsoy M, Bakuy V, Bal H. Late popliteal artery pseudoaneurysm mimicking deep vein thrombosis: Two case reports. Damar Cer Derg 2018;27(1):37-41.

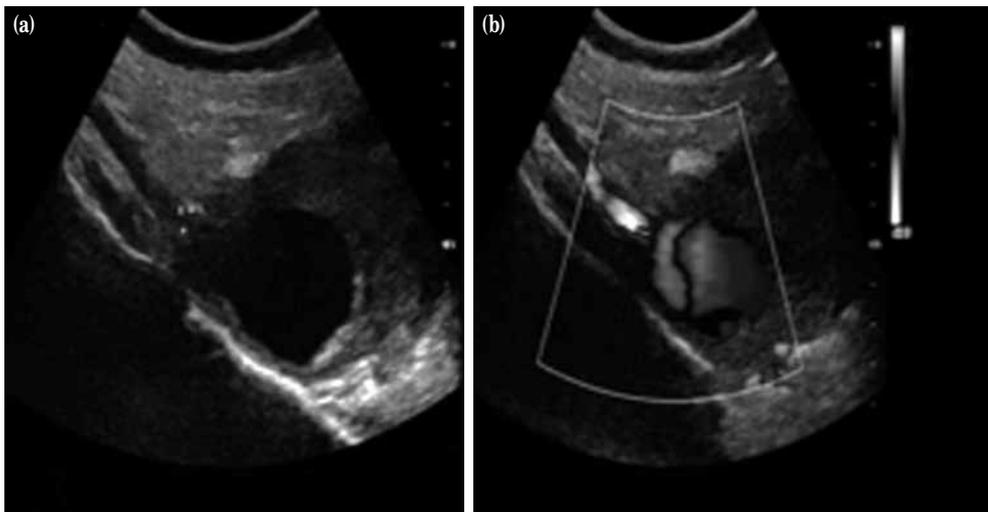


Figure 1. (a, b) The color Doppler ultrasound images of pseudoaneurysm in Case 1, and (b) yin-yang sign.

knee, and positive Homans' sign. There was a 3 cm difference below the knee level and 1 cm difference in the ankle level between two legs. The patient had the history of high tibial osteotomy surgery four years prior to her admission. The patient was pre-diagnosed with deep vein thrombosis (DVT), and CDU was requested. The flow of the crural veins was found to be slow in CDU. Doppler examination revealed a pulsatile mass in the gastrocnemius muscle at the level of popliteal trifurcation. Arterial CDU showed a partially thrombosed pseudoaneurysm with a size of 9×7 cm was associated with the distal lumen of the popliteal artery in the left posterior crural region. There were back and forth movements in the hematoma pouch (yin-yang sign) (Figure 1a, b). Contrast-enhanced computed tomography (CECT) revealed pseudoaneurysm formation originating from the distal popliteal artery (Figure 2a, b). Surgery was recommended to the patient; however, she refused undergoing surgery. She was discharged from the hospital with antiaggregant treatment, compression socks, and extremity rest.

Case 2- A 35-year-old male patient was admitted to our clinic with strain and pain during flexion and extension of his left foot. He had an ongoing history of swelling in the left lower extremity for two months. On physical examination, he had a weak pulse on dorsalis pedis artery, swelling on his left lower extremity below the knee, and positive Homans' sign. There was a 2 cm difference between the lower extremities, below the knee. The preliminary diagnosis of the patient was

DVT. Arterial and venous CDU were requested. He had also the history of a non-vehicle traffic accident, and fracture in left tibia. He underwent osteo-plate operation by the orthopedic surgeons three months before his admission to our clinic. Venous CDU examination findings were normal; however, arterial examination revealed an active pseudoaneurysm sac sized 10×6 cm with back and forth flow, originating



Figure 2. (a, b) Contrast-enhanced computed tomography images of left lower limb infrapopliteal pseudoaneurysm in the first patient. (b) Posterior-anterior images of left lower limb on contrast-enhanced computed tomography.

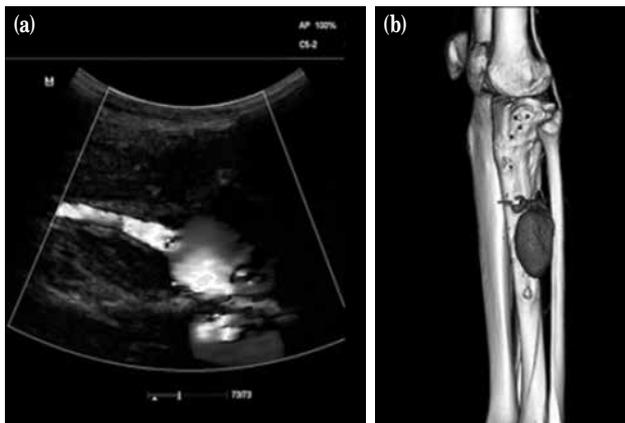


Figure 3. Preoperative images of Case 2. (a) Color Doppler image of the pseudoaneurysm, yin-yang sign; (b) Contrast-enhanced computed tomography images of lower limb infrapopliteal pseudoaneurysm.

from the left tibialis anterior artery (Figure 3a). Then, CECT was performed, and a pseudoaneurysm originating from the anterior tibial artery was observed (Figure 3b). Open surgery was scheduled for the patient and a written informed consent was obtained. Compression tape was applied over the knee, and the anterior tibial artery (ATA) was exposed at the level of popliteal trifurcation through a vertical incision, lateral to the aneurysm. After draining hematoma, a 0.5 cm injured section was found on the ATA. A saphenous vein graft was prepared from the ipsilateral extremity. The injured section of the ATA was removed, and saphenous vein interposition was performed (Figure 4a, b). A Hemovac drain was placed. The operation was successfully terminated after controlling surgical bleeding. The patient's distal pulses were palpable in the postoperative period. The movements of the lower extremity improved in postoperative follow-up. Triphasic arterial flow was observed, and control CDU showed no DVT.

DISCUSSION

True aneurysms of the popliteal artery are the most common peripheral arterial aneurysms; however, pseudoaneurysms are rare.^[3] Among popliteal artery aneurysms, 0 to 3.5% are pseudoaneurysms.^[2] In their retrospective study, Gumuştas et al.^[4] examined 690 patients with popliteal artery disease with digital subtraction angiography (DSA), and found PAP incidence to be 0.23%. A popliteal artery aneurysm is considered if the diameter of the diameter is greater than 0.7 cm.^[3] In addition, PAP consists

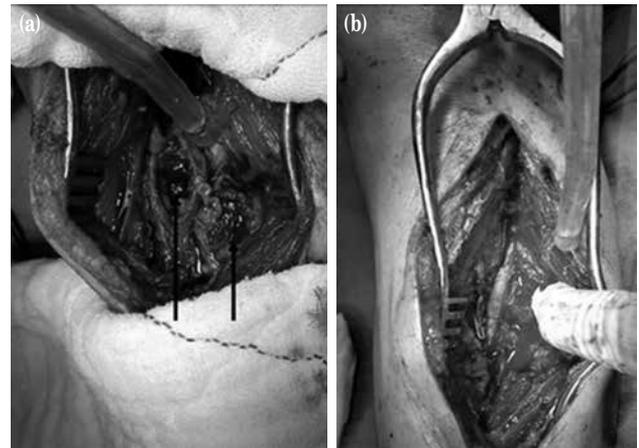


Figure 4. Intraoperative images of Case 2. (a) Vascular injury image during operation, (b) Saphenous vein interposition to tibialis anterior artery.

of encapsulated extravasations, and it may occur due to deterioration in arterial continuity caused by blunt or penetrating trauma, previous surgery of the popliteal artery, local infections, bone tumors such as osteochondromas, endovascular interventions or acupuncture.^[5-7] Progressive circulation of the arterial flow within the sac may cause enlargement and rupture of it.^[8] Thrombosis, embolism, and ischemia are among the secondary complications caused by compression of the aneurysm sac. Swelling of the lower extremity occurs as a result of progressive enlargement of PAP. Pseudoaneurysms may mimic DVT due to compression of the nerves and soft tissues.^[9] In this article, we aimed to contribute to the literature with two cases of randomly captured giant PAPs in patients prediagnosed with DVT. In a patient with leg pain and swelling after orthopedic surgery, DVT should first be ruled out. Deep vein thrombosis most frequently occurs in the veins of lower extremity, while it may rarely be seen in the veins of upper extremity, pelvis, and other parts of the body. The incidence of DVT is approximately 15% after orthopedic surgery.^[2] Although it is rare, leg swelling may occur secondary to arterial injury, particularly after orthopedic surgery in the lower extremity.^[10] On physical examination, the presence of a diameter difference between the extremities, painful swelling with a positive Homans' sign may be seen in the affected leg. However, differential diagnosis of DVT may not be possible with physical examination alone. Our cases were referred to our clinic with leg swelling, long after orthopedic surgery. Deep vein thrombosis was first suspected, and venous CDU was performed as the initial diagnostic

method in these patients. However, there was an active pseudoaneurysm sac at the level of popliteal artery trifurcation in our patients, instead of DVT. Also, CDU showed giant pseudoaneurysms of the infrapopliteal arteries in both patients. We chose CDU as the initial imaging modality due to high sensitivity and specificity of CDU in infrapopliteal vascular pathologies.^[9] Popliteal artery pseudoaneurysm may develop secondary to trauma or orthopedic surgery, and it may be clinically asymptomatic. They may appear in the early or late postoperative period. Woolgar et al.^[10] reported seven patients with late pseudoaneurysms, and showed that development of the pseudoaneurysm might be delayed up to 24 months. In our study, two patients were diagnosed with delayed pseudoaneurysms after orthopedic surgery. The first case was diagnosed with a pseudoaneurysm four years following orthopedic surgery whereas the second case was diagnosed three months after surgery.

As there is no standard approach in the treatment of pseudoaneurysms, clinical experience is decisive. Ensuring coagulation by pressing the neck of the pseudoaneurysm under ultrasound can be the initial treatment approach. Surgical repair, endovascular intervention, and thrombin injection are other treatment options. Surgical approach should involve drainage of the aneurysm sac, and repair of the artery.^[11,12] Primary repair of the artery is usually not adequate. In our second case, the pseudoaneurysm sac was drained, and venous graft interposition was performed. Arterial stenosis was not observed in control CECT. Endovascular intervention is one of the treatment approaches. Limiting factors for endovascular treatment may be the site of the lesion, its relationship with the trifurcation branches, the diameter of the vessel, and availability of a coated stent. Garg et al.^[8] published the results of successful endovascular treatment of popliteal artery aneurysms in 21 patients, and their results were found to be encouraging.^[8] Compared to open surgery, endovascular repair provides a more rapid and functional recovery, shorter hospital stay, less blood loss and does not require general anesthesia in selected patients. However, the number of the patients suitable for endovascular approach may be small, particularly, when the region below the knee is considered due to specific vascular anatomy. In our both cases, the arterial diameters were suitable for endovascular stent grafting; however, the locations of the aneurysms were not suitable. Therefore, we did not consider endovascular interventions as an option

in our patients. Unsuitable lesions, high treatment costs, unavailability of stents, and need for long-term antiplatelet therapy are the main disadvantages of endovascular approach. Application of topical thrombin into the pseudoaneurysm sac has taken its place as a viable option, particularly in iatrogenic femoral artery pseudoaneurysms.^[13] This approach is widely used in our clinic for small and medium-sized pseudoaneurysms with narrow necks. In our cases, we did not prefer thrombin injection due to large aneurysm sacs, and short and wide pseudoaneurysm necks.

In conclusion, PAP should be kept in mind in patients admitted to the hospital with painful swelling of the leg, particularly in presence of the history of orthopedic surgery.

Declaration of conflicting interests

The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

Funding

The authors received no financial support for the research and/or authorship of this article.

REFERENCES

1. Kim YJ, Baek WK, Kim JY, Park SW, Jeon YS, Lee KH, et al. Pseudoaneurysm of the popliteal artery mimicking tumorous condition. *J Korean Surg Soc* 2011;80:71-4.
2. Sun Y, Chen D, Xu Z, Shi D, Dai J, Qin J, et al. Incidence of symptomatic and asymptomatic venous thromboembolism after elective knee arthroscopic surgery: a retrospective study with routinely applied venography. *Arthroscopy* 2014;30:818-22.
3. Wright LB, Matchett WJ, Cruz CP, James CA, Culp WC, Eidt JF, et al. Popliteal artery disease: diagnosis and treatment. *Radiographics* 2004;24:467-79.
4. Gümüştaş S, Çakır Ö, Çiftçi E, Yavuz Ş, Kanko M, Sarısoy HT, et al. Angiographic findings in popliteal artery diseases. *Türk Gogus Kalp ve Dama* 2012;20:56-64.
5. Perez-Burkhardt JL, Gómez Castilla JC. Posttraumatic popliteal pseudoaneurysm from femoral osteochondroma: case report and review of the literature. *J Vasc Surg* 2003;37:669-71.
6. Davies AJ, Roberts DE. A complication following a total knee arthroplasty. *Br J Radiol* 1999;72:317-8.
7. Kao CL, Chang JP. Pseudoaneurysm of the popliteal artery: a rare sequela of acupuncture. *Tex Heart Inst J* 2002;29:126-9.
8. Garg K, Rockman CB, Kim BJ, Jacobowitz GR, Maldonado TS, Adelman MA, et al. Outcome of endovascular repair of popliteal artery aneurysm using the Viabahn endoprosthesis. *J Vasc Surg* 2012;55:1647-53.

9. Lafçı B, Yetkin U, Yaşa H, Özsöyler İ, Özbek C, Gürbüz A. Tibioperoneal trunkus distalinde ateşli silah yaralanması sonrası gelişmiş yalancı anevrizma: Olgu sunumu. *Damar Cer Derg* 2007;16:35-9.
10. Woolgar JD, Reddy DS, Robbs JV. Delayed presentation of traumatic popliteal artery pseudoaneurysms: a review of seven cases. *Eur J Vasc Endovasc Surg* 2002;23:255-9.
11. Gillespie DL, Cantelmo NL. Traumatic popliteal artery pseudoaneurysms: case report and review of the literature. *Trauma* 1991;31:412-5.
12. Flanigan DP. Aneurysms of the peripheral arteries. In: Moore WS, editor. *Vascular surgery: a comprehensive review*. 5th ed. Philadelphia: WB Saunders; 1998. p. 457-67.
13. Schneider C, Malisius R, Kuchler R, Lampe F, Krause K, Bahlmann E, et al. A prospective study on ultrasound-guided percutaneous thrombin injection for treatment of iatrogenic post-catheterisation femoral pseudoaneurysms. *Int J Cardiol* 2009;131:356-61.