Which do You Prefer in Popliteal Artery Aneurysm: Endovascular Treatment or Surgery?: Case Report

Popliteal Arter Anevrizmalarının Tedavisinde Hangisi Tercih Edilmelidir? Cerrahi mi, Endovasküler Yöntemler mi?

Erdal ŞİMŞEK,[a]
Aytaç ÇALIŞKAN,[a]
Ufuk TÜTÜN,[a]
Zafer İŞCAN,[a]
Emre KUBAT,[a]
Başak SORAN TÜRKCAN[a]

[a]Department of Cardiovascular Surgery, Türkiye Yüksek İhtisas Training and Research Hospital, Ankara

Geliş Tarihi/*Received:* 20.07.2013
Kabul Tarihi/*Accepted:* 31.12.2013

Yazışma Adresi/*Correspondence:*
Aytaç ÇALIŞKAN
Türkiye Yüksek İhtisas Training and Research Hospital,
Department of Cardiovascular Surgery, Ankara,
TÜRKİYE/TURKEY
aytac.caliskan@gmail.com

ABSTRACT Popliteal artery aneurysm is an important limb- and life-threatening disease. Both conventional surgery and endovascular interventions are found to be curative, and must be performed when appropriate. A 63-year-old male patient with a hematoma in his right thigh was referred to our hospital. He had a previous endovascular intervention in our hospital for his right popliteal aneurysm two years previously. Doppler ultrasonography showed a 23x11 cm sized hematoma and endograft stents were out of the arterial lumen. Organized and infected-looking material was removed under general anesthesia. Popliteal artery aneurysm may progress and is associated with increased morbidity and mortality. Surgical repair, and in recent years, endovascular interventions are alternatives in the treatment. We think that endograft intervention is a good option for patients who are not good candidates for surgery.

Key Words: Popliteal artery; endovascular procedures; aneurysm

ÖZET Popliteal arter anevrizması hayat ve ekstremiteyi tehdit eden ciddi bir patalojidir. Cerrahi veya endovasküler yöntemlerle zamanında müdahale şarttır. Altmış üçyaşında erkek hasta, sağ uyluk bölgesinde hematom ile hastanemize başvurdu. Hastaya iki yıl önce sağ popliteal anevrizması için hastanemizde endovasküler girişim yapılmıştı. Doppler ultrasonografide hastanın sağ uyluğunda 23 cm uzunluğunda ve 11 cm genişliğinde hematom olduğu ve yerleştirilen stent greftlerin arter lumeni dışında oldukları rapor edilmişti. Genel anestezi altında hastanın bu hematomu ve enfekte görünümlü materyal cerrahi olarak çıkarıldı. Popliteal arter anevrizmaları morbidite ve mortalite ile sonuçlanabilir. Tedavide cerrahi ve endovasküler yöntemler kullanılabilir. Ameliyat için uygun olmayan hastalarda, endovasküler girişimlerin iyi bir seçenek olduğunu düşünüyoruz.

Anahtar Kelimeler: Popliteal arter; endovasküler prosedürler; anevrizma

Damar Cer Derg 2015;24(1):61-4

Peripheral arterial aneurysms are mostly seen in popliteal and femoral arteries, respectively. These aneurysms are relatively rare but can be hazardous if they remain untreated.[1,2] Atherosclerosis is the leading cause in the development of aneurysms, but popliteal artery's locational characteristics, genetic predisposition and immunological causes are the other etiologic factors, yet mostly being hypothetical.[3] Doppler ultrasonography, computerized tomography (CT), magnetic resonance (MR) angiography (MRA) and digital subtraction angiography (DSA) are the diagnostic modalities for the diagnosis and follow-up of these aneurysms.[3] It is advised to treat patients who have popliteal aneurysms greater than 2 cm, and

doi: 10.9739/uvcd.2013-37103

femoral artery aneurysms greater than 3 cm, even though they are asymptomatic.[4,5] Treatment of choice was surgery in the past, but especially in last decade, endovascular treatment of lower extremity aneurysms became an alternative to surgery in selected patients. It was shown that treatment of lower extremity aneurysms can be safely achieved by using endovascular therapy.[6] Although long term results are not yet clear, we have information about early mid-term results of endovascular therapy. Limb salvage and patency rates are satisfying,[7,8] but some unexpected complications can ruin this uneventful course.

CASE REPORT

A 63-year-old hemiplegic male patient with a swelling in his right thigh was referred to our hospital. At his first referral two years ago, popliteal artery aneurysm was diagnosed, and he was not considered as a good candidate for open surgery due to his comorbidities. Endovascular intervention was performed, and four pieces of the Viabahn stent grafts composed of reinforced polytetrafluoroethylene (PTFE) attached to an external nitinol stent structure were implanted to his aneurysmal segment.

At his second referral with swelling, Doppler ultrasonography confirmed the hematoma which was measured 23 cm in length and 11 cm in width, and the endograft stents were out of the arterial lumen. Doppler ultrasonography could not reveal any distal blood flow, but the patient did not have any ischemic complaints or findings. He only had serious pain over his right thigh. Risk factors were hypertension and left sided hemiplegia. He also had an abdominal aorta aneurysm with a 65 mm maximum diameter, and an intracranial basilar artery aneurysm. We decided to perform a CT-angiography of the lower extremities. Graft fragments were seen in CT-angiography (Figure 1).

Prior to the operation, we planned to perform a femoro-distal bypass after draining the hematoma. At the operation, femoral incision was made and common, superficial and deep femoral arteries were found. Superficial femoral artery was totally calcified except its proximal 1 cm segment. Then, we made an incision over the hematoma, approximately 20 cm in length. Organized and infected-looking material was removed (Figure 2). It was noted that four endograft stents were out of the arterial lumen, and freely floating in hematoma. After bleeding was partially controlled, exploration did not show an intact and greftable popliteal artery for anastomosis. However, the leg was still adequately perfused via collaterals in spite of the absence of a by-pass procedure, so nothing further was done. The patient was followed up in the intensive care unit after the operation, and administered heparin infusion. He gave a good response to inotropes and transfusions, and his blood pressure normalized. He was discharged on the third day after the operation with a warm right foot without any ischemic findings. He did not have any other morbidities associated with the surgery.

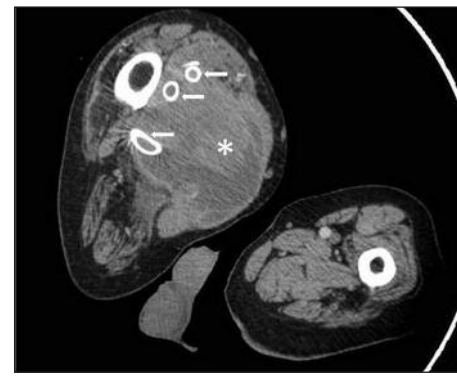

FIGURE 1: Computerized tomography of the lower extremity showing the graft fragments (white arrows) and the area of hematoma (asterix).

FIGURE 2: Viabahn stent graft.

DISCUSSION

Popliteal artery aneurysm is an important cause of limb-threatening ischemia. Once an acute ischemia developes due to a thrombosed popliteal artery aneurysm, the amputation rate can be very high.[9] On the contrary, popliteal aneurysms are mostly asymptomatic and diagnosed incidentally.[10] After diagnosis of a popliteal aneurysm, it is important to know the right time for intervention. Popliteal aneurysm expansion rates are directly proportional with the aneurysm size, therefore, a good surveillance can be helpful to determine the intervention time.[11] Surgery is still the gold standard procedure with very satisfactory graft patency rates in the treatment of femoropopliteal aneurysms.[12] In high risk patients, it is suggested to use endografts for aneurysm repair. The graft patency rates are not significantly different for open and endovascular interventions.[13] On the pther hand, both procedures are open to some complications like graft occlusions, thrombosis, stent fractures, endoleaks, increase in aneurysm size and ruptures.[4,14-16] We used Viabahn stent grafts for our patient. Viabahn stents have good primary and secondary patency rates, and their long term patency is satisfying.[15,17]

CONCLUSION

In this case, we suspected aneurysmal expansion and subsequent rupture, as reported similar cases. Collateral flow like retrograde flow through geniculate vessels, mimicking type II endoleak, are blamed for this complication.[18,19] Gradual expansion in 2 years and sudden increase of hematoma size, a sign of rupture, supports our hypothesis. Excising these aneurysms and performing endoaneurysmorrhaphy may be an appropriate procedure in suitable cases.[19] Flow diverting stents can lead to aneurysm thrombosis, and can be an alternative to this problem.[20] To avoid such mortal and destructive consequences, close observation and follow-up of the aneurysms and their collateral flow is necessary.

Conflict of Interest

Authors declared no conflict of interest or financial support.

REFERENCES

1. Whitehouse WM Jr, Wakefield TW, Graham LM, Kazmers A, Zelenock GB, et al. Limb-threatening potential of arteriosclerotic popliteal artery aneurysms. Surgery 1983; 93(5): 694-9.
2. Dawson I, Van Bockel JH, Brand R, Terpstra JL. Popliteal artery aneurysms. Long-term follow-up of aneurysmal disease and results of surgical treatment. J Vasc Surg 1991;13(3): 398-407.
3. Zaporteza K, Anaya-Ayala JE, Davies MG, Peden EK, Lumsden AB. Recurrent collapse of a Gore TAG endograft in treating an aortoesophageal fistula. Vascular 2011;19(3):154-8.
4. Mahmood A, Salaman R, Sintler M, Smith SR, Simms MH, Vohra RK. Surgery of popliteal artery aneurysms: a 12-year experience. J Vasc Surg 2003;37(3):586-93.
5. Hirsch AT, Haskal ZJ, Hertzer NR, Bakal CW, Creager MA, Halperin JL, et al.; American Association for Vascular Surgery; Society for Vascular Surgery; Society for Cardiovascular Angiography and Interventions; Society for Vascular Medicine and Biology; Society of Interventional Radiology; ACC/AHA Task Force on Practice Guidelines; American Association of Cardiovascular and Pulmonary Rehabilitation; National Heart, Lung, and Blood Institute; Society for Vascular Nursing; TransAtlantic Inter-Society Consensus; Vascular Disease Foundation. ACC/AHA 2005 guidelines for the management of patients with peripheral arterial disease (lower extremity, renal, mesenteric, and abdominal aortic): executive summary a collaborative report from the American Association for Vascular Surgery/Society for Vascular Surgery, Society for Cardiovascular Angiography and Interventions, Society for Vascular Medicine and Biology, Society of Interventional Radiology, and the ACC/AHA Task Force on Practice Guidelines (Writing Committee to Develop Guidelines for the Management of Patients With Peripheral Arterial Disease) endorsed by the American Association of Cardiovascular and Pulmonary Rehabilitation; National Heart, Lung, and Blood Institute; Society for Vascular Nursing; TransAtlantic Inter-Society Consensus; and Vascular Disease Foundation. J Am Coll Cardiol 2006;47(6):1239-312.
6. Antonello M, Frigatti P, Battocchio P, Lepidi S, Cognolato D, Dall'Antonia A, et al. Open repair versus endovascular treatment for asymptomatic popliteal artery aneurysm: Results of a prospective randomized study. J Vasc Surg 2005;42(2):185-93.
7. Curi MA, Geraghty PJ, Merino OA, Veeraswamy RK, Rubin BG, et al. Mid-term outcomes of endovascular popliteal artery aneurysm repair. J Vasc Surg 2007;45(3): 505-10.
8. Garg K, Rockman CB, Kim BJ, Jacobowitz GR, Maldonado TS, et al. Outcome of endovascular repair of popliteal artery aneurysm using the Viabahn endoprosthesis. J Vasc Surg 2012;55(6):1647-53.
9. Kropman RH, Schrijver AM, Kelder JC, Moll FL, de Vries JP. Clinical outcome of acute leg ischaemia due to thrombosed popliteal artery aneurysm: systematic review of 895 cases. Eur J Vasc Endovasc Surg 2010;39(4):452-7.

10. Inahara T, Toledo AC. Complications and treatment of popliteal aneurysms. Surgery 1978;84(6):775-83.
11. Pittathankal AA, Dattani R, Magee TR, Galland RB. Expansion rates of asymptomatic popliteal artery aneurysms. Eur J Vasc Endovasc Surg 2004;27(4):382-4.
12. Bracale UM, Corte G, Di Gregorio A, Poceraro F, Machi P, et al. Surgical repair of popliteal artery aneurysms remains a safe treatment option in the endovascular era: a 10-year single-center study. Ann Ital Chir 2011;82(6):443-8.
13. Pulli R, Dorigo W, Fargion A, Pratesi G, Innocenti AA, et al. Comparison of early and midterm results of open and endovascular treatment of popliteal arteryaneurysms. Ann Vasc Surg 2012;26(6):809-18.
14. Midy D, Berard X, Ferdani M, Alric P, Brizzi V, Ducasse E, et al.; AURC French University Association for Vascular Surgery. AURC French University Association for Vascular Surgery. A retrospective multicenter study of endovascular treatment of popliteal artery aneurysm. J Vasc Surg 2010;51(4):850-6.
15. Jung E, Jim J, Rubin BG, Sanchez LA, Choi ET, Sicard GA, et al. Long-term outcome of endovascular popliteal artery aneurysm repair. Ann Vasc Surg 2010; 24(7):871-5.
16. Naundorf M. Does a type II endoleak occur after surgical elimination of a popliteal artery aneurysm? An Analysis of 42 patients and a comparison with current literature Zentralbl Chir 2011;136 (5): 444-50.
17. 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(6):1647-53.
18. Mousa A, Faries PL, Bernheim J, Dayal R, DeRubertis B, Hollenbeck S, et al. Rupture of excluded popliteal artery aneurysm: implications for type II endoleaks- a case report. Vasc Endovascular Surg 2004;38(6):575-8.
19. Ebaugh JL, Morasch MD, Matsumura JS, Eskandari MK, Meadows WS, Pearce WH. Fate of excluded popliteal artery aneurysms. J Vasc Surg 2003;37(5): 954-9.
20. Sfyroeras GS, Dalainas I, Giannakopoulos TG, Antonopoulos K, Kakisis JD, Liapis CD. Flow-diverting stents for the treatment of arterial aneurysms. J Vasc Surg 2012;56(3):839-46.