CASE REPORT

A case report of rare coexistence of posttraumatic complex arteriovenous fistula and venous pseudoaneurysm of lower limb: Concomittantly arterial and venous endovascular stent graft placement

Fahrettin Kucukay

Turkiye Yuksek Ihtisas Hospital, Department of Radiology, Sihhiye 06100, Ankara TURKEY

Correspondence: Fahrettin Kucukay
E-mail: fkucukay@hotmail.com
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Arteriovenous fistulas of the lower limb are frequently resulted from trauma and treated with endovascular techniques. However, venous pseudoaneurysms are extremely rare entities existing together with fistulas, and most preferred therapy for them is still surgery. We present a 31-year- a male patient who has a complex arteriovenous fistula between superficial femoral artery and vein and pseudoaneurysm in the distal segment of superficial femoral vein with a history of firearm injury. The patient was treated with both arterial and venous endovascular stent-grafting.


Introduction

Complex arteriovenous fistulas (AVF) due to a trauma like a gunshot wound have a significant risk of ischemia and thrombosis for the lower extremity. Such AVFs and venous severe dilatation and pseudoaneurysms are extremely rare presenting together. We report a case who had a trauma-induced complex AVF in left lower extremity treated with endovascular stenting. This case report describes endovascular stent implantation in both arterial and the venous component of the fistula.

Case Report

A 31-year-old man presented with ischemic steal syndrome and rest pain in the left leg. The patient had a gunshot injury two months earlier and was consulted to our interventional radiology department after the establishment of arteriovenous fistula on multidetector computed tomography angiography. On MDCTA volume-rendered image, an arteriovenous fistula between distal left superficial femoral artery (SFA) and superficial femoral vein (FV). We performed digital subtraction angiography (Fig.1) for left lower extremity with the contralateral approach and found complex AVFs between distal left SFA and SFV. Then a Viabahn stent-graft (Gore medical, Arizona, USA) 6x100 mm in size was implanted in SFA, and serial post dilatations were performed with a balloon 6x40 mm in size. Control arteriography revealed that the fistula was blocked. Venography was made introducing a sheath into the left common femoral vein with the antegrade approach to visualize the venous system. The venography showed severe aneurysmal dilatation at the distal segment of SFV and venous pseudoaneurysm almost 2 cm in diameter nearby bullet core. To avoid the potential complications such as bleeding secondary to rupture, pulmonary embolism and due
to this likely mortality, we deployed a venous stent-graft. A 6 × 61 mm Advanta V12 balloon expandable stent-graft (Maquet getinge group, Rastatt, Germany) was off-label placed into the SFV lumen. On the following venography, it was seen aneurysmal structures and pseudoaneurysm had been excluded. Lastly, a final arteriogram was obtained, and it was confirmed that all of the fistulas had been closed. The patient received a 300 mg loading clopidogrel dose, followed by 75 mg once daily (qd) and aspirin 300 mg/day for six months. After the procedure, the patient was uneventful and discharged the day after. On sixth-month control MDCTA, the stent grafts were open without any sign of distal peripheral thromboembolism or pulmonary embolism.

**Discussion**

Arteriovenous fistulas and venous pseudoaneurysms may be either congenital and acquired [3]. The most frequent cause of acquired forms is trauma in particular penetrating type [1]. Complex AVFs of lower limbs may lead to critical ischemia and heart failure in case of high flow and prolonged duration. Besides, severe venous aneurysmal dilatations, despite its rarity, carry the risk of life-threatening complications, especially pulmonary embolism. Our patient had a critical
limb ischemia caused by AVF. To salvage from limb amputation intervention should be done as soon as possible [2]. Approximately one decade ago, the first line therapy was surgical procedures for the AVFs [3]. Currently, the preferred treatment is endovascular stent-grafting. The goal of stent-grafting the artery is not only to redistribute the blood flow providing the adequate blood supply for the involved limb but also to block feeding arteries of the fistula. In cases that have only a few feeding arteries, occluders like vascular plugs, coils, etc. can be utilized. But if there are many feeding arteries throughout a long segment of the artery, the stent graft is a more suitable option. In such cases, it is often difficult to advance to the distal of fistula. Roadmapping in digital subtraction angiography must be used to overcome this difficulty.

Severe venous dilatation and pseudoaneurysms are uncommon accompanying condition following posttraumatic AVFs [3]. These venous abnormalities of which mainstay treatment is surgery, have a significant potential risk of pulmonary embolism and possible death [4]. Currently, developments and innovations in endovascular techniques encourage to prefer venous stent-grafting as an alternative means of treatment. In the present case, we chose the endovascular stent-grafting for the closure of venous pseudoaneurysm. Comparing to surgery, the endovascular treatment that can be performed under local anesthesia is well-tolerated by the patient and shorter hospitalization time [5, 6]. Thereby the patient will not be exposed to the complications of surgery such as infection, hemorrhage as well as the risk of general anesthesia.

Treatment of arterial pseudoaneurysms and AVFs with stent-graft is a common treatment method. Placement of a venous stent is not always needed in many areas due to the low-pressure system, but the risk of pulmonary embolism had warranted it in this case. We were obliged to use two different stent-grafts in the vein and artery. Currently, only balloon expandable stent-grafts are available in large sizes up to 16mm. The locations that we deployed the stent-grafts might not be a preferable choice but our short-term follow-up results were excellent.

To broaden the knowledge and observe the short and long term outcomes of this strategy, large series and prospective randomized trials are required.

References