

Endovascular Treatment of Arteriovenous Fistula After Gunshot Wound

Ateşli Silahla Yaralanma Sonrası Gelişen Arteriyovenöz Fistülün Endovasküler Tedavisi

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ABSTRACT Acquired arteriovenous fistulas are not uncommon after gunshot wound events. We herein report a case of a 38 years old man with a diagnosis of delayed arteriovenous fistula (AVF) between superficial femoral artery (SFA) and femoral vein (FV) after gunshot wound in a left leg above knee. Diagnosis confirmed by multislice tomography and conventional angiography. It was decided to exclude fistula by endovascular approach. A 13 mm endoprosthesis with a diameter of 10 mm was placed along the SFA by the introduction of an 11F sheath after contralateral femoral artery insertion under local anesthesia. Postimplantation arteriography revealed normal flow through the SFA without evidence of leakage of contrast and any residual connections. This case illustrates that endovascular closure is a safe approach, with reduced morbidity, compared with open surgery.

Key Words: Wounds, gunshot; arteriovenous fistula; angiography, digital subtraction

ÖZET Ateşli silah yaralanmalarından sonra görülen arteriyovenöz fistüller çok da nadir değildir. 38 yaşında erkek olgu da sol diz üstünde ateşli silahla yaralanma sonrasında süperfişyal femoral arter (SFA) ve femoral ven arasında gelişen ve geç teşhis edilmiş arteriyovenöz fistül burada sunulmaktadır. Tanı çok kesitli bilgisayarlı tomografi ve konvansiyonel anjiyografi ile doğrulanmıştır. Fistülün endovasküler yaklaşımla kapatılmasına karar verilmiştir. Lokal anestezi altında 10 mm çapında 13 mm endoprotez karşı taraf femoral arterden 11 F kateter yolu ile sol SFA'ya yerleştirilmiştir. İmplantasyon sonrası çekilen arteriyografide SFA'da rezidüel geçiş veya kaçak olmaksızın normal akım paterni saptanmıştır. Bu olgu sunumu göstermektedir ki endovasküler kapama, açık cerrahiy-le karşılaştırıldığında daha düşük morbiditeyle güvenle uygulanabilmektedir.

Anahtar Kelimeler: Yaralar, kurşun; arteriyovenöz fistül; anjiyografi, dijital çıkarmalı

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The use of endovascular techniques for the treatment of various arterial pathologies has increased significantly during the last decade. The use of a stent-graft for traumatic arterial lesions was first described in 1994.¹

Indications for repair of AVF include: failure to spontaneously closure within 2 months, arterial or venous enlargement, symptoms secondary to venous engorgement, congestive heart failure, and worsening of symptomatic claudication.²

Stent graft applications offer quick, single step treatment, with few procedural complications.

CASE REPORT

A 38 years old male was admitted to our clinic with pain, swelling in the interior of left thigh, and restricted movement ability in the relevant extremity. In patient's history, there was a gunshot injury in the mid-interior of left thigh three months ago and the progressive swelling of left leg and started thrill on wounded area in two weeks after trauma. He had not undergone any surgical operation after injury in his two days hospital stay. There was thrill, systolic murmur and difference in diameter between the legs at the level of the ankle. Patient was hemodynamically stable with normal echocardiographic findings and no sign of heart failure was detected. Arteriovenous fistula between the left superficial femoral artery (SFA) and vein were confirmed by computed tomography angiography (CTA) (Figure 1) and digital subtraction angiography (DSA). CTA examination revealed that left SFA diameter of 12mm and right SFA was in 7 mm in diameter and this difference begins at the level of common iliac arteries and lasts at the end of observed fistula. Also, the left femoral vein was found dilated as expected and its diameter was 14 mm at the level of fistula. Approximately 3 cm long fistula was observed between the SFA and FV.

An interventional approach as closing the defect with a covered stent was planned and procedure



FIGURE 1: 3 dimensional computed tomographic view of fistula.

was performed under local anesthesia. The patient was monitored with pulse oximeter, electrocardiography and blood pressure measurements. A percutaneous catheter was placed through the right femoral artery with a 0.0350 Terumo guidewire, insertion of the sheath and performance of angiogram was done, heparin was administered intravenously at a dose of 100 IU/kg of body weight. Guidewire was exchanged for a 0.025 Terumo and the Hemo-bahn transluminally placed endovascular graft (W.L. Gore, US.) was deployed and a routine completion angiogram was obtained (Figure 2). Post-op-

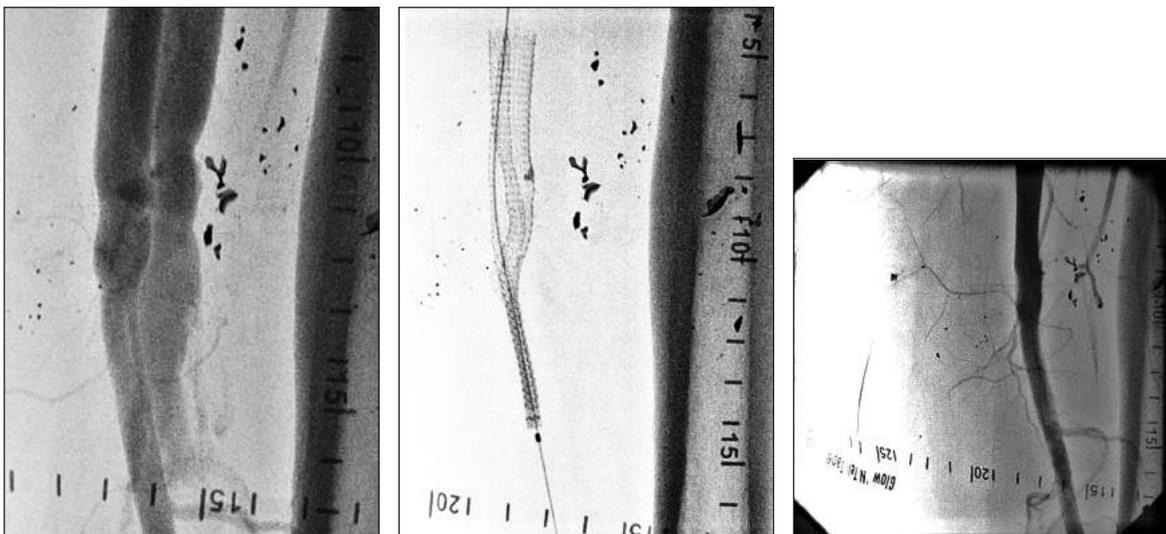


FIGURE 2: Angiograms taken preprocedurally, after deployment of stent graft, and as control.

eratively, from the 6th-hour, nadroparin was given subcutaneously, 2850 IU every 12 hours depending on the patient's weight until discharge. The patient recovered without any complications and was discharged from our department on the first postoperative day. His medication consists of 75 mg clopidogrel for the next 3 months, and 100 mg acetylsalicylic acid per day continuously. After a follow-up period of 18 months patient had a patent endovascular graft evaluated with vascular ultrasound and remained free of symptoms.

DISCUSSION

Posttraumatic arteriovenous fistulas are the vascular complications resulting from local traumas. The reported incidence of arteriovenous fistula in civilian vascular injuries varies from 2 to 4 percent.³ Because of the high risk of complications, early diagnosis and treatment is very important. Transluminally placed endovascular grafts were initially developed to treat traumatic lesions, with satisfactory interesting results.²

The Hemobahn was developed by W. L. Gore and Associates. It consists of a self-expanding nitinol stent internally covered with ultrathin PTFE premounted folded on a delivery catheter. Self-expanding stent-grafts are more flexible and are resistant to external forces in superficial locations.⁴ Balloon-expanding stent-grafts may lead to risk of compression and kinking.⁵

This procedure can be done under local anesthesia and is well tolerated by the patient associated with a shorter hospitalization time than closure with surgical techniques. Surgical complications such as hemorrhage and infection, as well as the risk of general anesthesia, can be avoided in endovascular treatment.

Arteriovenous fistulas of SFA can be treated safely via endovascular grafts. This technique can be performed safely and with a high success rate with careful selection of patients. We believe that endovascular closure technique of simple superficial femoral arteriovenous fistulas is safer and preferable than a surgical approach.

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