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Open surgery: Still a great option to treat patients with post-traumatic arteriovenous fistulas: A case report

Roman Kalinin, Igor Suchkov, Nina Mzhavanadze, Yulia Borisova, Ilya Panin

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Abstract

BACKGROUND

In the modern era of endovascular surgery percutaneous interventions are being widely used to treat a number of vascular disorders including arteriovenous fistulas (AVF). Still, patients with hostile anatomy or complicated cases such as large post-traumatic AVFs may be successfully treated using conventional vascular surgery.

CASE SUMMARY

This paper presents state-of-the-art treatment options in subjects with post-traumatic AVFs and a case-report of a successful open surgical approach in a patient with a 25 year old history of a post-traumatic AVF between the common femoral artery and common femoral vein.

CONCLUSION

Open surgery is still a great option to treat patients with post-traumatic arteriovenous fistulas with hostile anatomy or in complicated cases. Concomitant conditions and complications should be addressed promptly.

Key Words: Arterio-venous fistula; Femoro-femoral AVF; Open vascular surgery; Case report

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Core Tip: Conventional open vascular surgery is a great option in treatment of post-traumatic arteriovenous fistulas involving femoral vessels in patients with hostile anatomy or complicated cases leading to aneurysm formation and limb ischemia.

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INTRODUCTION

Stab, gunshot wounds or other traumas to the groin may lead to the discrete injury to the femoral vessels and nerve with delayed complications. Exact rates of post-traumatic arterio-venous fistulas (AVF) of the lower extremity arteries are not known. When not diagnosed in a timely manner, certain AVF complications may develop. Among them are lower leg edema, heart failure[1], vein dilation and chronic venous insufficiency[2], lower leg ischemia, trophic ulcers.

Percutaneous interventions are being widely used to treat a number of vascular disorders including AVF[3,4]. Still, patients with hostile anatomy or complicated cases such as large post-traumatic AVFs may be successfully treated using conventional vascular surgery.

We present a case of a male patient with a 25 year old history of a post-traumatic AVF between the common femoral artery and common femoral vein.

CASE PRESENTATION

Chief complaints

Non-healing left leg ulcers and a pulsatile mass in the left groin.

History of present illness

A 62 - year old male was admitted to the vascular surgery department with complaints on the lower limb trophic ulcers (Figure 1) and a pulsatile mass in the left groin. The patient had a history of a single stab wound to his left groin 25 years prior to admission. The subject recalled undergoing a surgical exploration of the left groin back in 1997, and had not contacted any medical professionals ever since.

History of past illness

No apparent history of past illnesses.

Personal and family history

No history of cardiovascular disease in the family.

Physical examination

A physical examination at admission showed that the patient was in a stable condition. Blood pressure was 130/80 mmHg, pulse rate 75 beats per minute, regular, respiratory rate 16, temperature 36.5°C. There were a large pulsatile mass in the left inguinal area, signs of lower leg ischemia, varicose veins and post-thrombotic syndrome, lower leg trophic ulcers, peripheral neuropathy.

Laboratory examinations

Laboratory tests were within normal values.

Imaging examinations

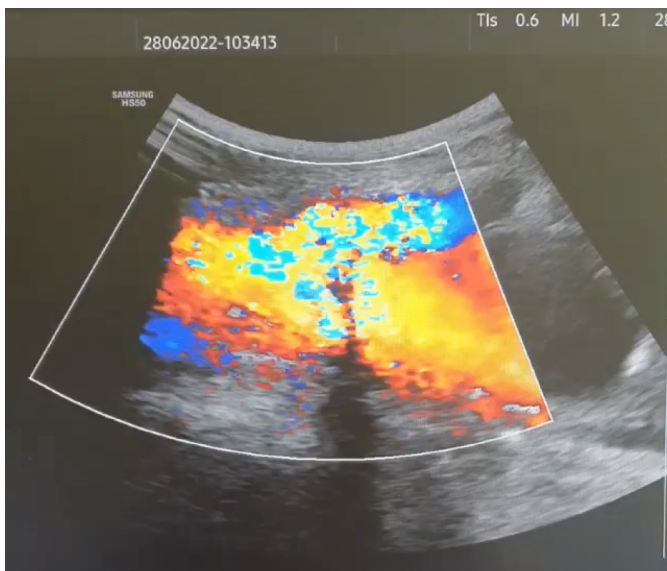
Duplex ultrasonography (DUS) revealed a communication and turbulent blood flow between the left common femoral artery and left common femoral vein (Figure 2), an aneurysm of the left common femoral vein with calcification of posterior and medial walls (Figure 3), occlusion of the femoral and deep femoral vein distal to their confluence with common femoral vein, and multiple varicose veins on the left thigh.

Contrast enhanced computed tomography angiography (CT-angiography) performed at admission revealed an arteriovenous fistula between the left common femoral artery and left common femoral vein with an aneurysm of the latter, aneurysms of the proximal parts of the left deep femoral vein, femoral vein with further venous occlusion; CT-angiography also revealed dilated left iliac arteries (Figure 4).



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Figure 1 A photograph depicting trophic ulcers of the left lower leg.



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Figure 2 A sonogram of the left groin showing a communication and turbulent blood flow between the left common femoral artery (on top) and the left common femoral vein (on bottom).

Echocardiography was also performed and showed a normal ejection fraction, insignificant right and left atrial enlargement, mild left ventricular hypertrophy.

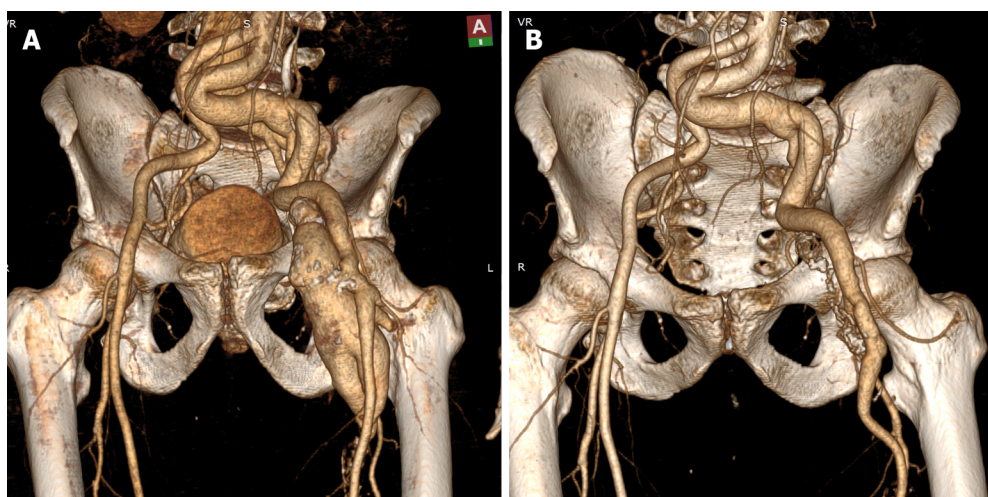
FINAL DIAGNOSIS

Post-traumatic arteriovenous fistula between left common femoral artery and left common femoral vein (after a single stab wound to the groin 25 years prior to admission). Aneurysm of the left common femoral vein. Post-thrombotic disease. Secondary varicose veins. Chronic lower limb ischemia. Trophic ulcers of the lower leg. Peripheral neuropathy.



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Figure 3 A sonogram of the left groin showing the aneurysm of the left common femoral vein with calcification of posterior and medial walls.

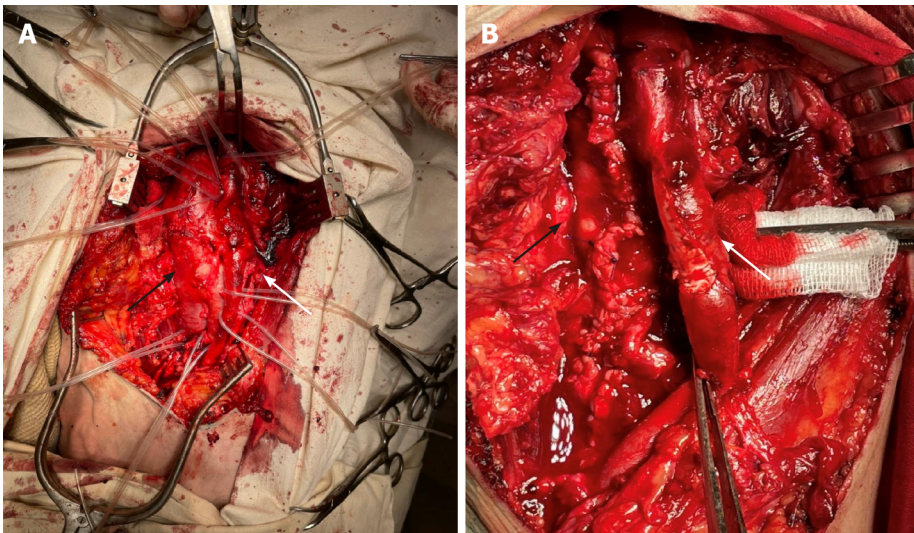


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Figure 4 Computed tomography scan. A: Computed tomography (CT) -scan with contrast enhancement at admission (before treatment) demonstrating arteriovenous fistula between the left common femoral artery and left common femoral vein with an aneurysm of the latter, aneurysms of the proximal parts of the left deep femoral vein, femoral vein with further venous occlusion; CT-scans also shows dilated left iliac arteries; B: CT-scan with contrast enhancement before discharge (after treatment) demonstrating the absence of arteriovenous fistula between the left common femoral artery and left common femoral vein with preserved flow through both femoral and deep femoral arteries.

TREATMENT

We performed an open procedure. An open access to the femoral vessels in the left infrainguinal area (Figure 5A) with some technical difficulties due to extended fibrotic lesions at the sight of the AVF and left common femoral vein aneurysm, closure of the AVF with a synthetic PTFE patch, aneurysmorrhaphy of the left common femoral vein (Figure 5B). We decided to keep the dilated iliac arteries intact in order to avoid the use of extended synthetic grafts in the settings of multiple trophic ulcers. Intraoperative blood loss was 250 mL. The patient was started on aspirin 75 mg QD, atorvastatin 20mg QD, heparin 1000 units per hour IV for 24 h followed by enoxaparin 40 mg SC QD, famotidine 40 mg QD, amoxicillin/clavulanic acid 875 mg/125 mg IV BID, thioctic acid 600 mg IV QD.



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Figure 5 We performed an open procedure. A: A photograph depicting the arteriovenous fistula between the left common femoral artery and left common femoral vein (white arrow), and the aneurysm of the left common femoral vein (black arrow); B: A photograph depicting a patch closure to the medial aspect of the common femoral artery (white arrow) and the common femoral vein following aneurysmorrhaphy (black arrow).

Endovascular treatment was avoided in this case due to the following reasons: placement of a stent graft into the common femoral artery would have put the patient at the potential risk of stent fracture related to hip joint flexion; blood flow to the deep femoral artery would have been compromised, too.

OUTCOME AND FOLLOW-UP

Post-operative period was uneventful. On the 7th day following the procedure we performed a repeat CT-scanning with contrast enhancement, which revealed the absence of arteriovenous fistula between the left common femoral artery and left common femoral vein with successfully preserved flow through both femoral and deep femoral arteries. Trophic ulcers healed within 2 mo following the procedure.

DISCUSSION

Endovascular surgery has been a leading trend in vascular surgery for the past decades. Arterio-venous fistulas of different nature and localization can be successfully treated using transcatheter techniques such as endovascular coiling, embolization or placement of a stent-graft depending on the clinical settings[5-7].

As the AVF was located directly across the orifice of the deep femoral artery and was accompanied by a large aneurysm of the left common femoral vein, we decided to perform an open procedure as the placement of an endovascular stent graft might have caused diminished flow through the deep femoral artery and led to the possibility of a thrombus formation in a dilated common femoral vein with subsequent risks of pulmonary embolism.

Stab, gunshot wounds or other traumas to the groin should be carefully evaluated to exclude injury to the femoral vessels and nerve, which eventually may lead to the formation of arteriovenous fistulas and vascular aneurysms. A misdiagnosis may occur due to simple wound exploration with no prior or further DUS, CT-angiography, or digital subtraction angiography, which are necessary in order to avoid delayed complications[8].

CONCLUSION

In the era of endovascular procedures, conventional open vascular surgery is still a great option in treatment of post-traumatic arteriovenous fistulas involving femoral vessels in patients with complicated cases leading to aneurysm formation and lower limb ischemia. Possible concomitant conditions or complications such as heart failure or peripheral neuropathy should be addressed promptly.

FOOTNOTES

Author contributions: Kalinin RE and Suchkov IA designed the report; Mzhavanadze ND treated the patient and collected the patient's clinical data; Borisova YuO and Panin IV performed diagnostic procedures; Suchkov IA, Mzhavanadze ND, Borisova YuO and Panin IV analyzed the data and wrote the paper.

Informed consent statement: The patient was not required to give informed consent to this case report because the analysis used completely anonymous data; the consent was obtained before performing any medical investigation or start of treatment as required.

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