



Stent graft infixation after venous dislodgement in a patient with femoral posttraumatic arteriovenous fistula

Fiksacija stent-grafta nakon venske dislokacije kod bolesnika sa femoralnom posttraumatskom arteriovenskom fistulom

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Abstract

Introduction. An arteriovenous fistula (AVF) is an abnormal connection between an artery and a vein which may result from traumatic injury or may occur as congenital abnormality. Stent graft repair through arteriovenous fistula could lead to complications. **Case report.** Endovascular stent graft repair in a 23-year-old patient with posttraumatic superficial femoral arteriovenous fistula was performed to cover a fistula. During the procedure the device migrated through the fistula into the femoral vein. Due to eventual risk of migration to the heart, a prompt decision was made to fix the stent graft with three puncture needles in the common femoral vein region under fluoroscopy guidance. The vascular surgeon was called to perform open surgery. **Conclusions.** The presented way of treating this rare complication in an extreme and uncommon situation is very efficient, safe and inexpensive.

Key words:

arteriovenous fistula; wounds and injuries; femoral artery; femoral vein; stents; dislocations; intraoperative complications; vascular surgical procedures.

Apstrakt

Uvod. Arteriovenska fistula (AV) je abnormalni spoj između arterije i vene i može biti posledica povrede ili se pojavljuje kao kongenitalni defekt. Postavljanje stent-grafta preko AV fistule može dovesti do komplikacija. **Prikaz bolesnika.** Prikazano je postavljanje endovaskularnog stent-grafta kod 23-godišnjeg bolesnika sa posttraumatskom superficialnom femoralnom arteriovenskom fistulom u cilju pokrivanja fistule. Tokom procedure došlo je do migracije proteze kroz fistulozni kanal u femoralnu venu. Zbog mogućeg rizika migracije u srce, donešena je brza odluka da se stent-graft fiksira punkcionim iglama u predelu femoralne vene pod vođstvom fluoroskopije. Vaskularni hirurg je pozvan da izvrši otvoreni hirurški zahvat. **Zaključak.** Prikazani način rešavanja retke komplikacije u ekstremnoj i neuobičajenoj situaciji je vrlo efikasan, siguran i jeftin.

Ključne reči:

arteriovenska fistula; povrede; a. femoralis; v. femoralis; stentovi; dislokacija fragmenata; intraoperativne komplikacije; hirurgija, vaskularna, procedure.

Introduction

An arteriovenous fistula (AVF) is an abnormal connection between an artery and a vein which may result from traumatic injury or may occur as congenital abnormality. It may be asymptomatic or manifested with symptoms such as pain, edema, varicosities and even heart failure¹. The treatment of AVFs can be performed by open surgery or using the endovascular approach²⁻¹⁰. Stent graft deployment is a widely recognized therapeutic procedure in patients with traumatic lower limb AVF and it could be followed by un-

welcome complications such as stent graft migration that requires a rapid decision¹.

Case report

A 23-year-old patient with the positive history of intravenous drug abuse was admitted to the Department of Vascular Surgery due to the injury made by drug needle insertion in the region of the right thigh. After the wound inspection and treatment, the patient was referred to the Department of Radiology for digital subtraction angiography

(DSA). A posttraumatic AVF was found in the distal third of the right femoral region connecting superficial femoral artery and superficial femoral vein (Figure 1). Due to strong leg pain, leg swelling, palpatory thrill over the fistula and positive laboratory findings for hepatitis C, operative treatment was indicated, but the patient refused it. After consultation with a vascular surgeon, we decided to perform endovascular procedure of covering AVF with stent graft. An 8F introducing sheath was inserted into the right superficial femoral artery over a 180 cm long 0.035" guidewire. As an addition to roadmapping DSA, a metallic

from the lesion nothing was seen, but after moving the table cranially the stent graft was seen in the region of the right femoral head, in the common femoral vein (CFV). It went through the AVF and stopped in the right CFV with possibility to move further up to the heart. Decision was made promptly and the stent graft was pinched with three puncture needles under fluoroscopy guidance in order to infix it in that position (Figure 2). The vascular surgeon was called and right CFV phlebotomy with stent graft extraction performed with surgical femoral AV fistula repair in the second act.



Fig. 1 – Digital subtraction angiography shows an arteriovenous fistula between the femoral artery and femoral vein



Fig. 2 – A stent graft fixed with puncture needles in the common femoral vein (an introducing sheath is seen in the femoral artery).

marker was placed on the patient's cover sheath to make sure the AVF entrance is correctly marked. The amount of heparin injected during the procedure was 5,000 IU. A crimped covered Jostent (Abbot vascular, USA), 4–9 mm wide and 49 mm long, was inserted in the right superficial femoral artery and deployed with an insufflation device set to the labelled pressure of 12 atmospheres. The following fluoroscopy showed a loose stent graft positioned 3 cm caudally from the AVF which was still open. After wire manipulation, the stent graft shifted up and was set to the right position. On the following fluoroscopy, right before redilation, the stent graft was not in the field of view but detached from the wire. After moving the table caudally

Discussion

What goes wrong during this procedure when a stent graft migrate through the fistula into the femoral vein? Some papers describe different causes of migration such as inflation device failure, stent graft production defect and an interventionist's malpractice in deployment⁹. In our case, the main cause of migration was a stent graft not inflated to its maximal diameter even though the insufflation device did show the labelled pressure of 12 atmospheres. Some authors suggest the use of a self-expandable stent graft rather than a balloon-expandable in this anatomical location, but it is questionable^{4,5}.

After the stent graft rapid fixing in the common femoral vein with puncture needles and thus prevention of migration to the heart, we decided not to insert a retrieval device through the femoral vein nor to insert a balloon to expand the stent graft because it could have pushed it cranially. Instead, open surgery was successfully performed by the vascular surgeon.

Our decision to promptly fix the migrated stent graft was based on the fact that it is much easier to do it under fluoroscopy for three reasons. First, stent graft is a metallic foreign body visible with radiography. Second, it is possible to make many projections in all planes (anteroposterior, posteroanterior, lateral and oblique). Third, it is possible to see the movement of the stent graft. On the contrary, in the operation room with no radiography it is practically impossible to localize the stent graft in the blood vessel. Therefore, the decision was to fix stent graft with puncture needles first, and then to perform open surgery.

Finally, the decision to choose endovascular treatment in the healing of iatrogenic femoral AVF in a young patient instead of surgical repair was against usual indications (conservative choices are advised due to the limited knowledge of long-term results of covered stents), because the patient had positive lab findings for hepatitis C and refused surgical repair.

Conclusion

Some papers report on arterial migration but no relevant papers on stent graft migration into veins in patients with AVF, so the real incidence on this complication is still vague. We think the presented unique stent graft fixation with puncture needles in the common femoral region, *ie* vein, in an extreme and complicated situation is efficient, safe and inexpensive approach to prevent further migration of the device.

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