

Giant Pseudoaneurysm in Distal Anastomosis of Prosthetic Aorto-Femoral Bypass

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SOUHRN

Úvod: Anastomotická pseudoaneurysmata (APSA) jsou pozdní komplikací cévních rekonstrukcí. Přesná prevalence APSA není známa, protože mnoho případů není v literatuře publikováno. Ruptura APSA je však spojena s vysokou morbiditou a mortalitou.

Metoda: Operační výkon byl proveden v celkové anestezii. Byl proveden řez v levém tříse současně s resekci nekrotické kůže nad APSA. APSA bylo pečlivě vypreparováno s potvrzením nálezu CT angiografie (CTA) – masivní trombotizované APSA vystupující z distální anastomózy aortofemorálního bypassu (AFB). APSA bylo plně resekováno. AFB byl částečně resekován a za pomoci protetického interpozitu prodloužen. Společná stehenní tepna byla podvázána pod tříselným vazem.

Výsledky: Pacient byl propuštěn 7. pooperační den s nízkými parametry zánětu. V současné době máme pacienta ve sledování jedenáct měsíců. Pacient má průchodnou cévní rekonstrukci bez známek anastomotického APSA na Dopplerově ultrasonografii.

Závěr: Nejčastějším místem výskytu APSA po AFB je femorální oblast. Endovaskulární léčbu lze použít pouze ve velmi vybraných případech s velmi vysokým rizikem komplikací souvisejících s endovaskulárními intervencemi.

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ABSTRACT

Introduction: Anastomotic pseudoaneurysms (APSA) are late complications of vascular reconstructions. The precise prevalence of APSA is not known, as many cases are not published in the literature. However, the rupture of APSA is associated with high morbidity and mortality.

Method: The procedure was performed under full anesthesia. An incision was made in the left groin resecting the necrotic skin above APSA. APSA was carefully dissected, confirming the CT angiography finding of a massive thrombotized APSA arising from the distal anastomosis of the aorto-femoral bypass (AFB). The APSA was fully resected. An extension of the AFB with the use of prosthetic vascular graft was performed. The common femoral artery was ligated below the inguinal ligament. Necrotic skin from the groin was resected, and the wound was closed with a patent vascular reconstruction.

Results: The patient was discharged on the 7th postoperative day with low infection's parameters. Currently we have eleven months of follow-up on the patient. The patient has a patent vascular reconstruction without any signs of anastomotic APSA on Doppler's ultrasonography.

Conclusion: The most frequent site of APSA occurrence after AFB is the femoral region. Endovascular treatment can be used only in very selected cases with a very high risk of complications related to the endovascular devices.

Keywords:

Anastomotic

Aortofemoral bypass

Late complication

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Introduction

Anastomotic pseudoaneurysms (APSA) are late complications of vascular reconstructions. The precise prevalence of APSA is not known, as many cases are not published in the literature. However, the rupture of APSA is associated with high morbidity and mortality ranging from 20–40%.¹ Skourtis et al. demonstrated in his series of 49 patients that anastomosis in the femoral region is the most frequent site for APSA formation.¹ The gold standard in the treatment of APSA is open repair consisting of the entire APSA resection followed by a vascular reconstruction. Endovascular modalities have limited applications in APSA treatment.² Nevertheless, the management of APSA especially in elderly polymorbid patients demands a multidisciplinary approach between interventional radiologists and vascular surgeons.³

Case presentation

An 86-year-old male patient was admitted into our center with a suspected massive APSA in the left groin (Fig. 1). Patient's medical history revealed; left prosthetic aorto-femoral reconstruction (AFB) 2003, full myocardial revascularization for ischemic heart disease and mitral valve repair in 2015, compensated arterial hypertension (WHO

II. stage), atrial fibrillation, and chronic obstructive pulmonary disease (III. stage). Patient's medical therapy upon admission; *aspirin*, *spironolactone*, *carvedilol*, *atorvastatin*.

Upon admission, the patient underwent a CT angiography (CTA) revealing a massive 10 × 9 cm thrombosed pseudoaneurysm in the distal anastomosis of the AFB in the left groin (Fig. 2). Patient's inflammatory parameters were low (CPR: 19.5 mg/l, WBC: $4.5 \times 10^9/l$). Therefore, an infection was ruled out as a cause of the APSA. A prophylactic intravenous antibiotic's treatment of *Cefazolin* was started in the patient as no cultures were available at the moment. The patient was scheduled for an open emergency repair of the APSA due to its size and local skin necrosis in the left groin.

The procedure was performed under full anesthesia. An incision was made in the left groin resecting the necrotic skin above APSA. APSA was carefully dissected, confirming the CTA finding of a massive thrombosed APSA arising from the distal anastomosis of the AFB. The AFB above the APSA and femoral bifurcation were carefully dissected. Under full heparinization, vascular clamps were placed on the AFB and femoral bifurcation. The APSA was fully resected. An extension of the AFB with the use of 7mm Silver graft (B. Braun Melsungen AG, B. Braun Aesculap AG, Tuttlingen, Germany) prosthesis was anastomosed to the femoral bifurcation (Fig. 3A). The



Fig. 1 – Anastomotic pseudoaneurysm after aorto-femoral bypass in the left groin: local finding



Fig. 2 – CT angiography showing thrombosed 8.9 × 10.5 cm anastomotic pseudoaneurysm after aorto-femoral bypass in the left groin.

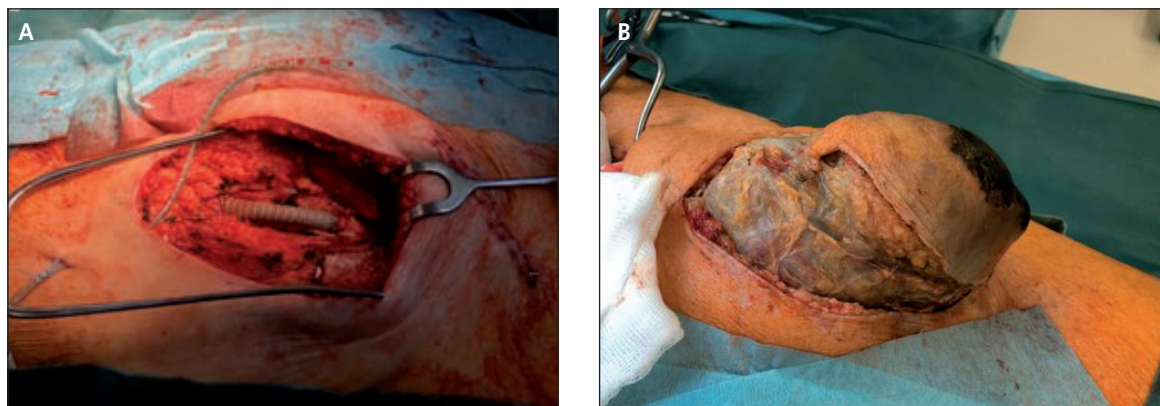


Fig. 3 – Periprocedural finding: (A) resected APSA, extension of AFB anastomosed to the femoral bifurcation using 7mm Silver graft. (B) Dissected anastomotic pseudoaneurysm (APSA) after aorto-femoral bypass (AFB) in the left groin.

common femoral artery was ligated below the inguinal ligament. Cultures were taken from the wound and the AFB. Necrotic skin from the groin was resected, and the wound was closed with a patent AFB (Fig. 3B).

The postoperative course was uneventful. All cultures from the AFB and wound came negative. The prophylactic intravenous antibiotic therapy with *Cefazolin* was stopped on the 3rd postoperative day. The patient was discharged on the 7th postoperative day with low infection's parameters (CPR: 17 mg/l, WBC: $4.8 \times 10^9/l$). Patient's medication was unchanged to the medication upon admission.

Currently we have eleven months of follow-up on the patient. The patient has a patent vascular reconstruction without any signs of anastomotic APSA on Doppler's ultrasonography.

Discussion

APSA is a pulsatile mass formed by a leakage of blood through a vascular anastomosis into the surrounding soft tissues forming a hematoma with turbulent blood flow with subsequent fibrous encapsulation.⁴

APSA after AFB is a severe vascular complication. The timeframe for development of APSA is reported to be between 5 and 9 years after primary operation.^{5,6} The APSA in the femoral region is very rare with an estimated prevalence of 0.8–2.2%.⁷ Skourtis et al. showed in his analysis that femoral anastomosis was the most frequent site of APSA formation after AFB. From all of the APSA formed after AFB, 85.7% were present in the femoral region. The associated mortality with an open emergency repair in this series was 46.6%.¹

Overt time a structural degeneration of a graft in a part of higher tensile stress, distal anastomosis of an AFB, can increase the chance of APSA formation.⁸ Takami et al. demonstrated that Gelatin sealed knitted dacron grafts frequently used for aorto-femoral reconstructions have been reported to dilate over up to 10.5% within five years.⁹ Thus, possibly playing a role in an APSA formation.

Until recently, the open repair had been the gold standard in the treatment of APSA. Emergency intervention

is crucial due to high mortality, high chance of APSA rupture especially in large APSA with weekend/necrotic skin above. Klonaris et al. reported the treatment of ruptured femoral artery APSA in six patients using emergency percutaneous covered stent deployment.¹⁰ However, the placement of stent graft in the femoral region, especially common femoral artery, is very risky as femoral artery is the most frequent access site for endovascular procedures.¹¹ The anatomical changes in the femoral artery during movement pose a high risk of stent-graft fracture, rupture and further arterial damage.^{2,12}

Conclusion

The presented case shows the successful treatment of a giant APSA after AFB. The most frequent site of APSA occurrence after AFB is the femoral region. Endovascular treatment can be used only in very selected cases with a very high risk of complications related to the endovascular devices. Open repair of APSA is up-to-date considered to be the gold standard.

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Conflict of interest

The authors declare that there is no conflict of interests regarding the publication of this article.

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Informed consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

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