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CASE STUDY

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Endovascular treatment of false aneurysm of the axillary artery in an obese woman with epilepsy: 5-year follow-up

Piotr Terlecki, Karol Terlecki, Stanisław Przywara, Jakub Kęsik, Tomasz Zubilewicz

Department of Vascular Surgery and Angiology, Medical University of Lublin, Poland

Abstract

False aneurysms of arteries in upper extremities are relatively rare. They occur in 2% of all false aneurysms, and axillary artery aneurysms are very uncommon. Open reconstructive surgery of axillary aneurysms bears a high risk of local and general complications. Progress in endovascular surgery, and especially miniaturization of delivery systems for stents and stent-grafts, has enabled their application in the treatment of small-size, peripheral arteries. Our article presents a case of an extremely obese woman — 170 kg, 57 years old — who presented with a massive, false aneurysm of the left axillary artery that resulted from an epilepsy attack. She was successfully treated with endovascular deployment of covered stent Viabahn™ ø 6 mm x 50 mm (W.L. Gore), performed with the randez-vous technique. After 5-year-long follow-up, the stent-graft is patent, in the correct position, without radiological signs of migration or endoleaks.

Key words: axillary artery aneurysm, endovascular treatment, Viabahn stent

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Introduction

The axillary artery hemorrhage caused by injury, expanding hematoma, or pseudoaneurysm usually requires immediate intervention. In most cases of surgical open repair, a thoracotomy is necessary. The invasiveness of this approach can be escalated due to blood loss, injury to the brachial plexus, infection of vascular prosthesis used for reconstruction, and all other possible complications related to extensive surgery.

Since the 1990s, the development of endovascular procedures in the treatment of abdominal aortic aneurysms has progressively enabled the application of this minimally invasive method for the treatment of peripheral aneurysms.

The first hand-made devices utilized Palmaz™ stents covered with PTFE prosthesis, brachial, or long saphenous vein [1]. Nowadays, delivery systems, such as Viabahn™ (W.L. Gore), Fluency™ (Bard), and Wallgraft™ (Boston Scientific), are miniaturized, which enables deployment of covered stents in arteries of a smaller diameter [2–4].

In the literature, the application of these systems in the treatment of popliteal artery aneurysms is widely described [5, 6]. There are some data regarding endovascular treatment of carotid artery aneurysms and aneurysms of arteries in upper extremities, mainly due to their less frequent incidence in the population [7, 8].

Case study

An extremely obese [170 kg (BMI > 60)] 57-year-old woman with diabetes mellitus, hypertension, and chronic obstructive pulmonary disease was admitted to

Address for correspondence: Karol Terlecki, Department of Vascular Surgery and Angiology, Medical University of Lublin, Poland, e-mail: karol.terlecki@gmail.com

the emergency department due to an epilepsy attack occurring on the street.

Because of the rapid progression of neurological symptoms, a head CT scan was performed showing epidural hematoma, requiring immediate neurosurgical decompression. Immediately after surgery, the general status of the patient improved, so respiratory therapy was ceased the next day.

Within the next few hours, the patient presented with increasing pain, subsequent edema, and expanding hematoma of her left arm. Ultrasonographical examination showed an excessive pseudoaneurysm of the axillary artery with a 1-cm long rupture.

AngioCT confirmed the presence of pseudoaneurysm, with an estimated diameter of 10 cm. Fractures of humeral bone and hemothorax were excluded. The symptoms were masked by the patient's obesity which simultaneously qualified the patient for endovascular treatment. The femoral artery was accessed in local anesthesia. A 7 Fr sheath was inserted, and an aneurysm was visualized on angiography (Fig 1). Multiple attempts to enter the distal segment of the axillary artery were unsuccessful, due to turbulent blood flow in the pseudoaneurysm and the small diameter of the axillary and brachial arteries. Therefore, the brachial artery was accessed distally with a 4 Fr sheath. Randez-vous technique with application of snare enabled successful pass-through. From femoral access, the Viabahn™ (W.L. Gore) stent-graft 6 mm/50 mm was inserted, accurately positioned, and deployed. Post-deployment ballooning (5 mm/60 mm balloon) was necessary for proper fixation. Control angiography showed complete exclusion of pseudoaneurysm.

Postoperative follow-up was uncomplicated. Control ultrasound examinations showed gradual regression of pseudoaneurysm size, so evacuation of hematoma was not necessary. Postoperative spectrum of blood flow in forearm arteries was normal (Fig. 2). Seven days after the endovascular procedure, prolonged due to a history of previous neurosurgical intervention, the patient was discharged home in good general condition.

Follow-up visits were conducted 1, 3, and 6 months after the procedure and then every half a year, for 5 years. Up to now, the stent-graft is patent, in the correct position, with complete re-absorption of hematoma, and without clinical symptoms of infection (Fig. 3, 4). The patient remains on once-daily 75 mg aspirin antiplatelet therapy.

Discussion

True aneurysms of axillary artery are relatively rare. Their etiology, similarly to abdominal aortic or peripheral aneurysms, is related to atherosclerosis, collagen vascular disease, infection, or poststenotic dilatation in patients with thoracic outlet syndrome. The majority of false axillary artery aneurysms are a consequence of penetrating or blunt trauma to the arm region, forced

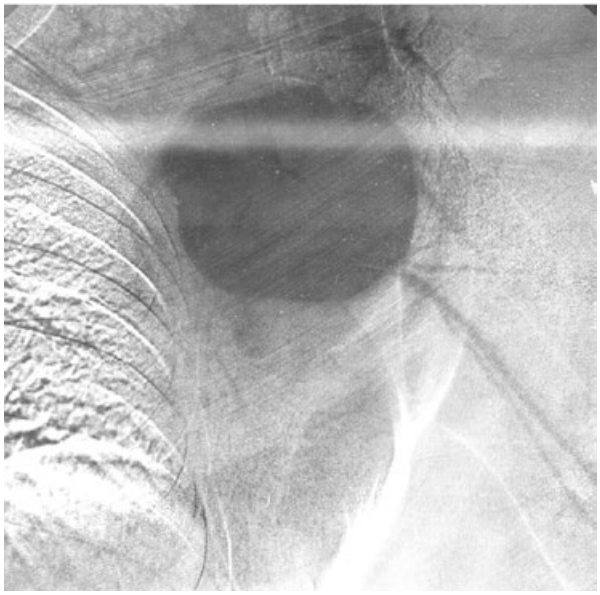

Figure 1. Preoperative angiography

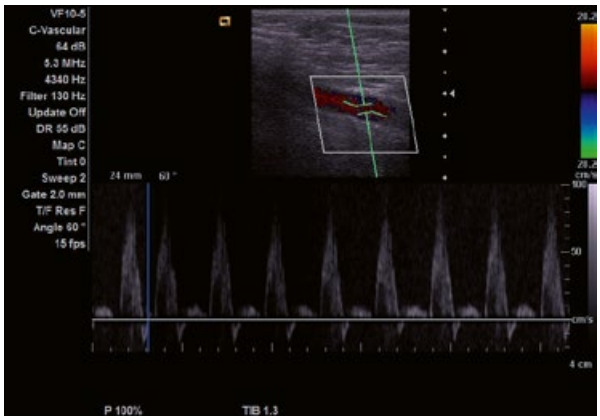

Figure 2. Postoperative ultrasound examination

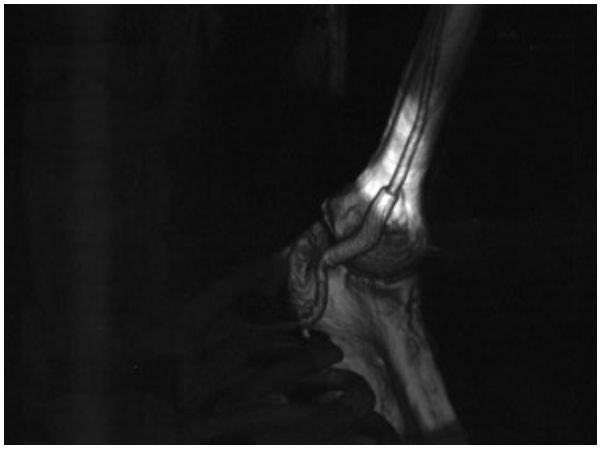

Figure 3. AngioCT control after 24 months

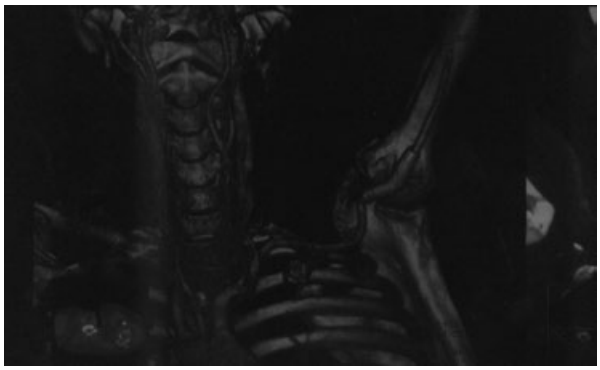

Figure 4. AngioCT control after 60 months

abduction of the upper extremity, and complications after brachial plexus anesthesia or implantation of a pacemaker [9, 10]. The frequency of vascular complications related to trauma of upper extremities that lead to formation of pseudoaneurysm is estimated to be about 2% of all false aneurysms [11]. Mortality associated with penetrating injury of the subclavian or axillary arteries reaches 20% [12] and is mainly caused by technically and anatomically difficult open vascular repair of injury. Minimally invasive treatment of false aneurysms includes, depending on localization and morphology, ablation with thrombin under ultrasound guidance, deployment of uncovered stents with subsequent coiling of the aneurysmal sac. However, this type of treatment is not recommended for the subclavian or axillary arteries. The method of choice in case of false axillary or subclavian artery aneurysms is implantation of stent-graft/covered stent [13].

Small series of cases were described by Toit [14] and Schoder [15]: 57 patients with subclavian artery injury and 12 patients with subclavian artery aneurysm. Patients were treated with endovascular techniques. In the Toit study, after 48-month follow-up, the stenosis of stent-graft was reported in 5 of 25 followed cases, and total occlusion in 3 cases. Schoder reported 100% patency of stent-grafts after 11.6 months of observation.

In our case study, the pathologically obese female patient (BMI > 60), with type I diabetes mellitus, hypertension, and chronic obstructive pulmonary disease underwent the endovascular treatment of pseudoaneurysm of the axillary artery. As a consequence of the epilepsy attack, the patient required neurosurgery to decompress epidural hematoma. Massive, around 10 cm in diameter, false aneurysm of the axillary artery formed most probably due to rapid abduction of the arm during seizures. A similar mechanism of injury of the axillary artery was described in baseball players — pitchers [16].

The pseudoaneurysm was excluded with stent-graft implantation. After 5-year-long follow-up, the stent-graft is patent, in the correct position, without radiological signs of migration or endoleaks. Color Doppler ultrasound shows a normal spectrum of blood flow within the stent-graft, as well as in the peripheral arteries. The patient remains in good general condition, without any motor dysfunction of the upper extremity.

Conclusions

Minimally invasive endovascular treatment of vascular trauma and true and false aneurysms of peripheral arteries seem to naturally replace open surgery, similarly to thoracic and abdominal aortic aneurysms repair. Our presented case, with 5 years of follow-up confirms the feasibility of the endovascular approach, but, of course, the analysis of larger series is required to set up standards of treatment.

Conflict of interest

None.

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