Aneurysm of the tibial-saphenous fistula in hemodialysis patient: the results of surgical treatment

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Abstract: Arteriovenous fistulas are widely used for hemodialysis patients with end-stage renal failure. Due to the lack of suitable veins because of the arteriovenous fistulas previously opened in the upper extremity, alternative access routes are being tested. Few complications of long-term alternative arteriovenous fistulas have been reported in the literature. We report the results of surgical repairs of aneurysms that occurred on anterior tibial-saphenous arteriovenous fistulas (along the vein) in patients with end-stage renal disease after 5 years on hemodialysis.

Keywords: vascular access, aneurysm, saphena magna, renal failure, long term

Introduction

Generally, arteriovenous (A-V) fistulas are performed in the veins of the upper extremity and in the non-dominant arm. Brescia-Cimino fistulas are the gold standard as an access route during hemodialysis. In patients that undergo dialysis repetitively, the fistula located in the wrist becomes obstructed over time and the patient cannot undergo dialysis from this same point. In such situations, it is preferred to form a new fistula or to use polytetrafluoroethylene (PTFE) graft. Another method is to form alternative access routes. For A-V fistulas, the most common complication is aneurysmal degeneration, which is seen in the late stage, and which appears like a true or false aneurysm. In this study, we report an A-V fistula aneurysm that was developed as an alternative to an A-V fistula between the anterior tibial artery and saphenous vein, a site not commonly reported in the literature, also the surgical treatment that we performed.

Case report

The 35-year-old female patient had previously repeatedly had A-V fistulas constructed on both upper extremities. Double-lumen catheters had been placed repeatedly in subclavian veins on both sides prior to the construction of A-V fistulas in her upper extremity. Allografts had been taken out from upper extremities because of graft infection. Bilaterally axillar veins were occluded. As there were no eligible veins to form a fistula in the upper extremity, surgery had been performed 5 years ago on the right lower extremity, between the anterior tibial artery and saphenous vein.

The patient presented to our out-patient department complaining of ballooning on the saphenous vein for about a year and especially a foot pain that had recently started to appear after walking. The patient’s physical systemic examinations were normal. A strong thrill could be obtained on the aneurysm (Figure 1). The pulse on the anterior tibial artery showed a weakening compared with the other foot. Preoperative
laboratory findings showed no pathologic evidence, except a lowered hematocrit value. Blood pressure (120/80 mmHg) was normal. The patient underwent a venous Doppler ultrasonography (USG) of the lower extremity in the radiology department. The aneurysm (45 × 30 mm) was detected in Doppler USG (Figure 2). The patient was taken into the operating room. A tourniquet was put on at the popliteal level. After administering local anesthetic, the aneurysm was opened on the vesicle. Subcutaneous tissue was gently dissected and bleeding was controlled from the proximal and distal aneurysm sides (Figure 3). The patient was given 5000 U heparin. After ensuring the resolution of thrill on the vesicle by tightening the tourniquet at 200 mmHg, venotomy was performed. The anastomotic region was narrowed with a purse suture using 4-0 prolene (Figure 4). Approximately 0.5–2 cm was cut from each side of the opened vein. The anastomosis vesicle was sutured over and over with 4-0 prolene (Figure 5). The diameter was reduced to approximately 0.5–1 cm. A strong thrill was palpated on the aneurysm. The patient was discharged on the same day and underwent dialysis from the same vein 2 days later. Low-molecule-weight heparin was used during the first dialysis after the surgical repair of the aneurysm. During follow-ups in the outpatient department, aspirin was given. It was observed that the patient’s complaints about foot pain on walking had lessened.

Discussion

The types of alternative A-V fistulas include saphenofemoral and saphenopopliteal loop fistulas, transposition of femoral vein to popliteal artery, axillary artery-popliteal vein PTFE bypass, posterior tibial artery-saphenous vein fistula, and femoro-femoral loop fistula.

Pierre-Paul et al. did a sapheno-femoral loop graft on seven patients. Perioperative acute occlusion or steal syndrome was not observed. Mean duration of primary patency was found to be 7 months. In the hemodialysis, 71.4% of the aneurysm fistulas (5/7) were functional. Six patients showed mild or moderate leg edema that required the use of compression socks. In another study, a tibial post-saphenous vein fistula was formed on 3 patients, who were followed-up over 12 months.
While one patient developed thrombosis at month 4, dialysis was successful in the other two patients. Our patient underwent dialysis without problems for 5 years via an A-V fistula that we formed between the tibial anterior and saphenous vein, a procedure that is reported for the first time.

Fistula aneurysm is observed as a result of collagen matrix degeneration occurring on the vein wall. Generally, repeated punctures of an A-V fistula on the same site accelerate the development of an aneurysm. The potential severity of the aneurysm is high due to the risk of rupture and possibly fatal hemorrhage. Doppler USG is the gold standard in the diagnosis of A-V fistula aneurysms and in postoperative follow-up.6 We did Doppler USG to evaluate the aneurysm before the operation.

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The author reports no conflicts of interest in this work.

References
