

CASE REPORT

Neo-Femoral Artery Reconstruction with Autologous Bifurcated Great Saphenous Vein Graft in an 88-Year-Old Patient with a Large Infected Pseudoaneurysm

Ludovic-Alexandru Szanto¹, Alexandru-Andrei Ujlaki-Nagy^{2,*}, Eliza Russu^{1,3}, Emil-Marian Arbănași^{1,3,4}

¹ Clinic of Vascular Surgery, County Emergency Clinical Hospital, Târgu Mureș, Romania

² Psychiatry Clinic 2, Mureș County Clinical Hospital, Târgu Mureș, Romania

³ Department of Vascular Surgery, George Emil Palade University of Medicine, Pharmacy, Science and Technology, Târgu Mureș, Romania

⁴ Doctoral School of Medicine and Pharmacy, George Emil Palade University of Medicine, Pharmacy, Science and Technology, Târgu Mureș, Romania

ABSTRACT

We present the case of an 88-year-old patient with multiple cardiovascular comorbidities who, on the first day after transcatheter aortic valve implantation (TAVI), developed sudden severe pain in the right lower extremity. Urgent computed tomography angiography (CTA) of the abdominal aorta and lower limbs revealed a patent right common iliac artery with thrombotic occlusion of the external iliac and femoral arteries. A transfemoral thromboembolectomy using a Fogarty catheter was performed at the iliofemoral axis, supplemented by local endarterectomy and patch angioplasty. Over the following three weeks, two additional interventions were required to evacuate an inguinal hematoma and secure hemostasis at the patch level. Three months later, the patient returned to the emergency department with severe groin pain and active bleeding from the wound. CTA revealed a large infected pseudoaneurysm of the common femoral artery, measuring approximately 4×2.5 cm. Reconstruction of the neo-femoral artery was carried out using an autologous bifurcated great saphenous vein graft, combined with a proximal sartorius muscle flap. At six months, CTA demonstrated patent femoral arteries without thrombus or hematoma and complete tissue healing.

Keywords: neo-femoral reconstruction, autologous vein graft, vascular surgery, infected pseudoaneurysm, TAVI

ARTICLE HISTORY

Received: July 20, 2025

Accepted: August 23, 2025

CORRESPONDENCE

Alexandru-Andrei Ujlaki-Nagy

Email: u.alex8@yahoo.com

INTRODUCTION

Aortic stenosis (AS) is associated with significant morbidity and mortality. It affects about 4% of people over the age of 65, and its prevalence increases with age. Without appropriate treatment, the estimated survival time after symptom onset is 1 to 2 years.¹ Transcatheter aortic valve

implantation (TAVI) has become the preferred treatment for patients at high surgical risk in recent years, owing to its increased patient comfort and shorter recovery time compared with conventional surgery.² The transfemoral approach is the recommended vascular access route, and the development of smaller-profile devices now allows

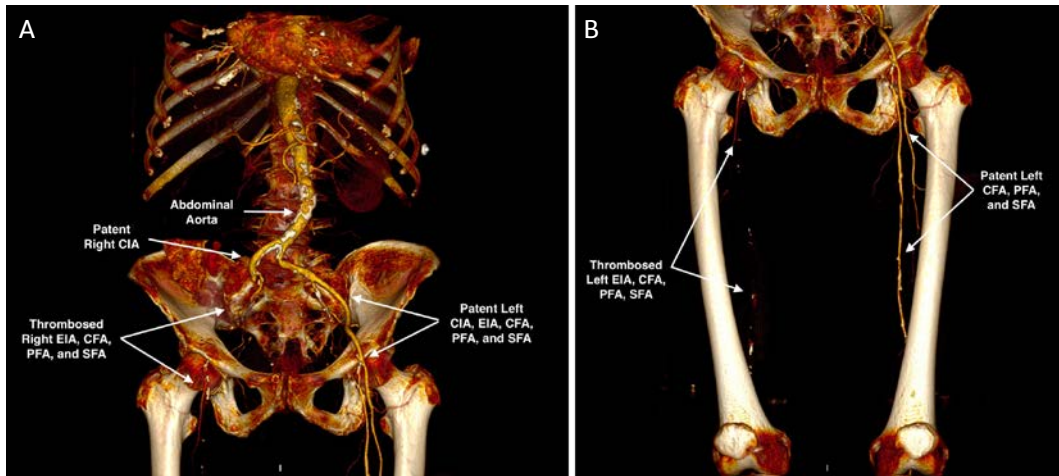


FIGURE 1. Preoperative CTA with 3D reconstruction showing thrombosis of the right EIA, CFA, PFA, and SFA: suprainguinal (A) and infrainguinal (B) views.

approximately 90% of patients to undergo transfemoral TAVI, thereby reducing access-related complications.³

Nevertheless, several vascular complications may occur following TAVI, including hematoma, arterial dissection, arterial rupture, pseudoaneurysm, distal embolization, or major bleeding.^{4–8} To improve outcomes, Hayashida *et al.*⁹ proposed the sheath-to-femoral artery ratio (SFAR) as an index for predicting vascular complications, demonstrating that a higher SFAR was associated with increased rates of major complications and 30-day mortality.⁹ Leclercq *et al.*¹⁰ further reported that the surgical approach to transfemoral TAVI was associated with a lower rate of vascular complications.

The aim of paper is to present the surgical management and outcome of an elderly high-risk patient who developed an infected femoral pseudoaneurysm after TAVI, with a focus on the feasibility and effectiveness of neo-femoral artery reconstruction using an autologous bifurcated great saphenous vein graft.

CASE PRESENTATION

We present the case of an 88-year-old patient with a history of hypertension, severe aortic stenosis, valvular cardiomyopathy in the dilated stage, NYHA Class III congestive heart failure, chronic kidney disease, and generalized

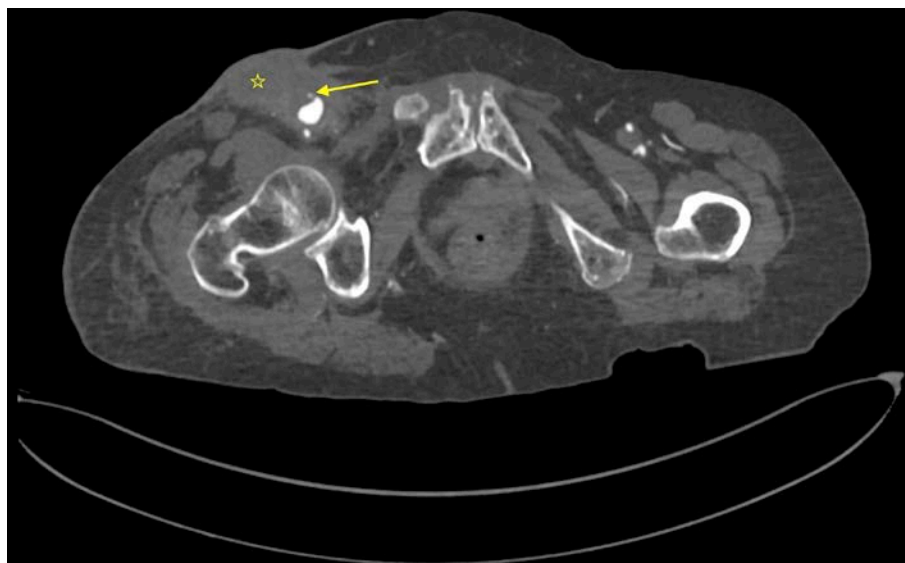


FIGURE 2. Preoperative CTA demonstrating the pseudoaneurysm with active bleeding (yellow arrow) and the peri-pseudoaneurysmal infection area (asterisk).

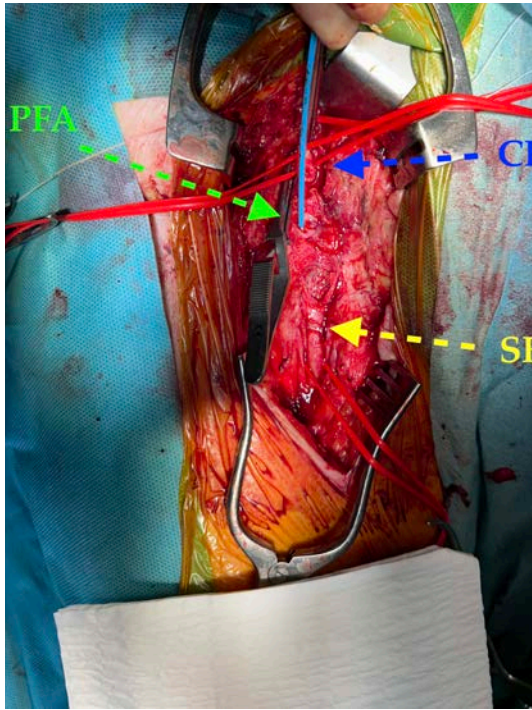


FIGURE 3. Intraoperative view after removal of the infected patch and preparation of the three femoral arteries for reconstruction.

atheromatosis, who was hospitalized in the cardiology department for a TAVI procedure. On the first postoperative day, the patient reported severe pain in the right lower extremity with abrupt onset. Clinical examination revealed marbled, cold skin extending to the right thigh, with mark-

edly reduced sensitivity and motility. Pulses of the femoral, popliteal, and below-the-knee arteries were absent in the right lower limb. An urgent computed tomography angiography (CTA) of the abdominal aorta and lower limbs revealed a patent right common iliac artery (CIA) and thrombotic occlusion of the external iliac artery (EIA), common femoral artery (CFA), and both superficial (SFA) and deep (PFA) branches of the right femoral artery (Figure 1).

The patient was admitted to the Vascular Surgery Clinic for surgical treatment. The procedure began with a right inguinal incision and exposure of the CFA, SFA, and PFA, which were suspended on loops. After systemic heparinization, the femoral arteries were clamped and a longitudinal arteriotomy was performed. Intraluminally, fresh thrombotic material was observed with complete absence of blood flow. A transfemoral thromboembolectomy using a Fogarty catheter was performed along the iliofemoral axis, supplemented by a local endarterectomy due to severe atherosclerotic lesions at the CFA bifurcation.

Finally, patch angioplasty of the CFA with extension to the SFA was carried out using a Dacron patch. Postoperatively, symptoms resolved, with restoration of the femoral pulse and Doppler signals at the popliteal and right pedal arteries, indicating preserved sensitivity and motility. Unfortunately, a reintervention was required 24 hours later to evacuate a right inguinal hematoma. The patient was transferred to the Cardiology Clinic on the second postoperative day for further medical management and monitoring.

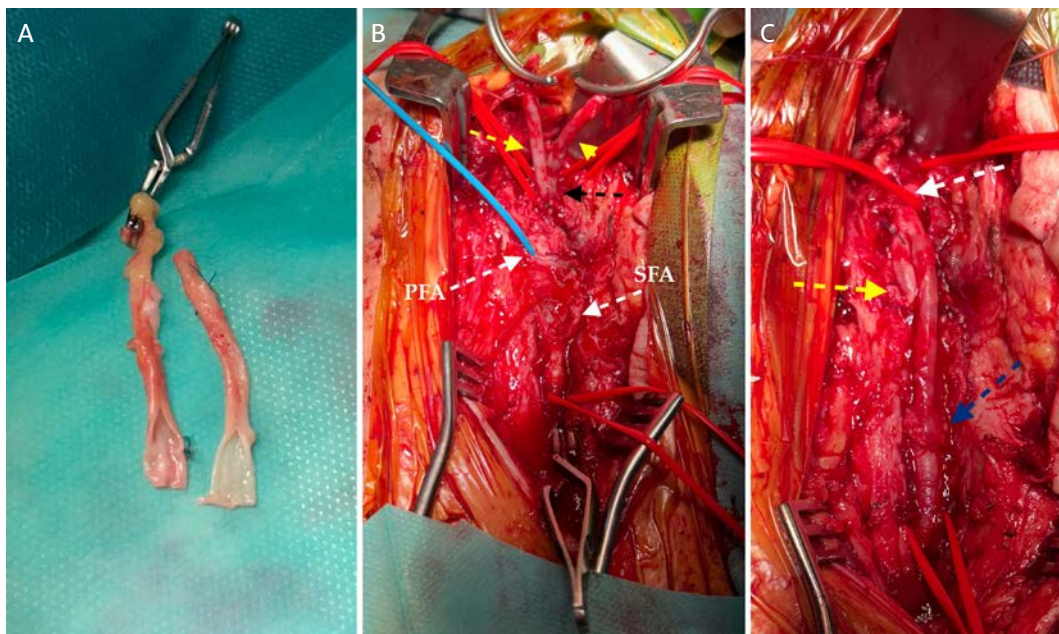


FIGURE 4. Intraoperative stages of neo-femoral artery reconstruction: creation of a Y-shaped graft from two GSV segments (A); proximal anastomosis with the CFA (B); and final appearance of the reconstruction (C).

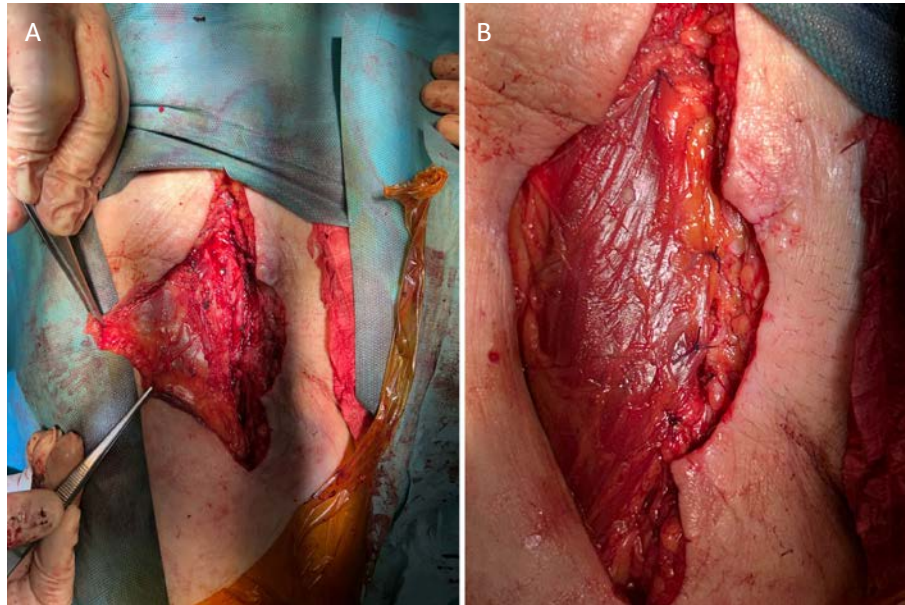


FIGURE 5. Coverage of the neo-femoral artery using a proximal sartorius muscle flap: flap preparation (**A**) and final appearance after coverage (**B**).

After a 3-week interval from the previous procedure, the patient presented to the emergency department with dehiscence of the right groin wound, purulent discharge, and local pain. Surgical wound cleansing with mechanical debridement and contact drainage was performed. Bacteriological analysis revealed abundant growth of methicillin-sensitive *Staphylococcus aureus* (MSSA), which was treated according to the antibiogram during hospitalization, with continued therapy at home.

The patient did not attend the scheduled follow-up, and 3 months later returned to the emergency department with severe groin pain and active bleeding from the wound. CTA revealed a large infected pseudoaneurysm of the CFA, associated with a purulent collection, measuring approximately 4×2.5 cm (Figure 2).

The patient was admitted to the Vascular Surgery Clinic for surgical treatment. An elliptical incision was made in the right groin, followed by careful dissection of the CFA below the inguinal ligament and of the distal SFA, which were secured with vessel loops. After clamping the CFA and SFA, the pseudoaneurysm was opened longitudinally, and the PFA ostium was identified. Intraluminal clamping was then performed using a Fogarty catheter (Figure 3).

After removal of the infected patch, the poor quality of the remaining arterial wall necessitated reconstruction of the CFA bifurcation. A neo-femoral bifurcation Y-shaped graft was fashioned from two segments of the great saphenous vein (GSV) (Figure 4A). The proximal anastomosis was performed with 5-0 Prolene, followed by partial declamping to verify graft patency and appearance (Figure

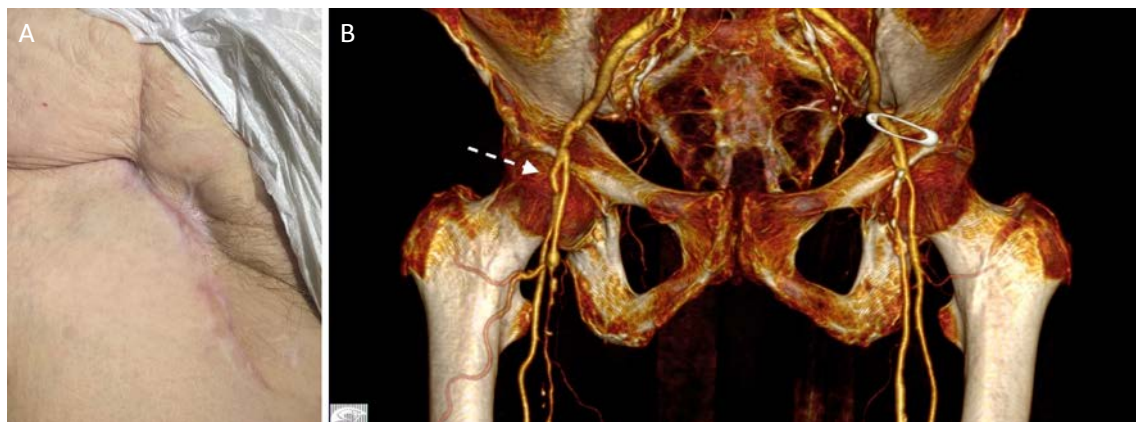


FIGURE 6. Clinical appearance (**A**) and 3D CTA reconstruction (**B**) 1 month after surgery.

4B). Subsequently, anastomoses were completed at the PFA and SFA with selective declamping, patency verification, and local hemostasis (Figure 4C).

To enhance the healing process, the defect was covered with a proximal sartorius muscle flap (Figure 5). Bacteriological examination of the excised Dacron patch identified infection with *Staphylococcus epidermidis*, which was treated according to the antibiogram.

On the seventh postoperative day, the patient was discharged in good general condition, with no evidence of infection, palpable right femoral pulses, and complete remission of symptoms. At the 6-month follow-up, CTA demonstrated patent femoral arteries without thrombus or right inguinal hematoma, and complete tissue healing (Figure 6).

DISCUSSION

Following TAVI, vascular complications are a major cause of morbidity and mortality and are also associated with increased healthcare costs and reduced quality of life. The most common complications involve the iliofemoral artery pathway.¹¹ Graft infection can result from surgical site infection, a well-known complication of peripheral arterial reconstructive surgery. Although relatively uncommon,¹² graft infection is associated with very high rates of amputation and mortality (52% and 58%, respectively), with a major impact on the outcome of revascularization procedures.^{12,13}

In a study by Lee *et al.*,¹³ 292 out of 317 patients underwent femoral endarterectomy. Groin infections occurred in 19.6% of cases: 6.3% developed deep infections extending into muscle and fascia, and 13.2% developed superficial infections. The median time to diagnosis was 17.5 days after surgery. Reported risk factors included diabetes mellitus, coronary artery disease, congestive heart failure, and chronic kidney disease, whereas current smoking was less prevalent among affected patients. Amputation and 30-day mortality rates in patients with groin infections were 11.3% and 6.5%, respectively.¹³ Although the current trend in the literature favors graft preservation through negative-pressure wound therapy, with or without muscle flap coverage,^{14,15} autologous material should be used whenever possible for lower limb revascularization. We strongly recommend the use of any available vein, such as the superficial femoral vein, to achieve favorable mid- and long-term outcomes.

Regarding the use of autologous vein grafts in arterial reconstruction after open surgery and infection of synthetic grafts or patches, the femoropopliteal vein is the most frequently used option.^{16–22} In a study by Dorsweiler *et al.*,¹⁶ which analyzed 19 femoral artery reconstructions utilizing femoral vein grafts, a patency rate of 87%,

limb salvage rate of 93%, and a reintervention-free rate of 81% were reported. In addition, Beck *et al.*¹⁸ observed that smaller graft size, a history of coronary artery disease, and smoking were associated with stenosis of the femoropopliteal vein. Similar findings were documented by Daenens *et al.*¹⁹ and Gibbons *et al.*²¹ In the present case, due to the smaller diameters of the femoral arteries, we opted to use the great saphenous vein to fashion a bifurcated graft. Similarly, Tsunekawa *et al.*²³ reported excellent one-year outcomes after carotid artery reconstruction with an autologous bifurcated saphenous vein graft.

CONCLUSIONS

This case illustrates the challenges of vascular reconstruction using a Y-shaped graft fashioned from two GSV segments in an elderly patient with multiple comorbidities and a history of infected prosthetic patches. Despite advanced age, frailty, and significant cardiovascular risk, a tailored surgical approach, including extensive debridement, autologous reconstruction, and sartorius muscle flap coverage, achieved successful short-term outcomes. At 6 months, the patient demonstrated complete wound healing, patent grafts, restored blood flow, and no signs of infection, underscoring the value of individualized vascular surgery even in high-risk elderly patients.

CONFLICT OF INTEREST

Nothing to declare.

ETHICS APPROVAL

This research was carried out in accordance with the principles stated in the Declaration of Helsinki and was approved by the ethical committee of the County Emergency Clinical Hospital of Târgu Mureș, Romania (approval no. 4531/04.03.2025).

CONSENT TO PARTICIPATE

The patient provided written informed consent for participation in this study and for the publication of this case report, including the accompanying images.

FUNDING

This work was supported by the George Emil Palade University of Medicine, Pharmacy, Science and Technology of Targu Mures (research grant no. 170/2/09.01.2024).

ACKNOWLEDGEMENT

We would like to express our sincere gratitude to C.A. Luca for her valuable contributions to the postoperative care of the patients described in this case report.

AUTHOR CONTRIBUTIONS

L.-A.S. and E.-M.A. led the conceptualization, methodology, original draft preparation, and review and editing. L.-A.S., A.-A.U.-N., E.R., and E.-M.A. contributed to validation. L.-A.S. and A.-A.U.-N. were responsible for formal analysis, investigation, resources, and data curation. E.R. was responsible for visualization, supervision, project administration, and funding acquisition. All authors have read and agreed to the published version of the manuscript.

REFERENCES

- Shivapour DM, Kapadia SR, Krishnaswamy A. Transcatheter Aortic Valve Replacement. In: Dryjski ML, Harris LM, eds. *Complications in Endovascular Surgery*. Elsevier; 2022:157–165. doi: 10.1016/B978-0-323-55448-0.00025-5
- Blackman DJ, Baxter PD, Gale CP, et al. Do outcomes from transcatheter aortic valve implantation vary according to access route and valve type? The UK TAVI Registry. *J Interv Cardiol*. 2014;27(1):86–95. doi: 10.1111/joic.12084
- Ates I, Cilingiroglu M. Percutaneous access versus surgical cut down for TAVR: Where do we go from here? *Catheter Cardiovasc Interv*. 2018;91(7):1363–1364. doi: 10.1002/ccd.27653
- Raju S, Eisenberg N, Montbriand J, et al. Vascular Complications and Procedures Following Transcatheter Aortic Valve Implantation. *Eur J Vasc Endovasc Surg*. 2019;58(3):437–444. doi: 10.1016/j.ejvs.2019.03.014
- Czerwińska-Jelonkiewicz K, Michałowska I, Witkowski A, et al. Vascular complications after transcatheter aortic valve implantation (TAVI): risk and long-term results. *J Thromb Thrombolysis*. 2014;37(4):490–498. doi: 10.1007/s11239-013-0996-7
- Loeser H, Wittersheim M, Puetz K, Friemann J, Buettner R, Fries JWU. Potential complications of transcatheter aortic valve implantation (TAVI) – an autopsy perspective. *Cardiovasc Pathol*. 2013;22(5):319–323. doi: 10.1016/j.carpath.2013.01.006
- Ranasinghe MP, Peter K, McFadyen JD. Thromboembolic and Bleeding Complications in Transcatheter Aortic Valve Implantation: Insights on Mechanisms, Prophylaxis and Therapy. *J Clin Med*. 2019;8(2):280. doi: 10.3390/jcm8020280
- Toggweiler S, Leipsic J, Binder RK, et al. Management of vascular access in transcatheter aortic valve replacement: part 2: Vascular complications. *JACC Cardiovasc Interv*. 2013;6(8):767–776. doi: 10.1016/j.jcin.2013.05.004
- Hayashida K, Lefèvre T, Chevalier B, et al. Transfemoral aortic valve implantation new criteria to predict vascular complications. *JACC Cardiovasc Interv*. 2011;4(8):851–858. doi: 10.1016/j.jcin.2011.03.019
- Leclercq F, Akodad M, Macia JC, et al. Vascular Complications and Bleeding After Transfemoral Transcatheter Aortic Valve Implantation Performed Through Open Surgical Access. *Am J Cardiol*. 2015;116(9):1399–1404. doi: 10.1016/j.amjcard.2015.08.003
- Derksen WJM, Verhoeven BAN, van de Mortel RHW, Moll FL, de Vries JPPM. Risk Factors for Surgical-Site Infection Following Common Femoral Artery Endarterectomy. *Vasc Endovascular Surg*. 2009;43(1):69–75. doi: 10.1177/1538574408323502
- Edwards WH, Martin RS, Jenkins JM, Edwards WH, Mulherin JL. Primary graft infections. *Journal of Vascular Surgery*. 1987;6(3):235–239. doi: 10.1016/0741-5214(87)90034-6
- Lee R, Singh R, DiMaggio C, Sheth S, Lin M. Incidence, Risk Factors, and Short-term Outcomes of Groin Infections After Femoral Bovine Patch Angioplasty. *Journal of Vascular Surgery*. 2025;81(6):e39–e40. doi: 10.1016/j.jvs.2025.03.102
- Dosluoglu HH, Loghmanee C, Lall P, Cherr GS, Harris LM, Dryjski ML. Management of early (<30 day) vascular groin infections using vacuum-assisted closure alone without muscle flap coverage in a consecutive patient series. *Journal of Vascular Surgery*. 2010;51(5):1160–1166. doi: 10.1016/j.jvs.2009.11.053
- Borghese O, Sapienza P, Venturini L, Bononi M, di Marzo L. Considerations: When More is Not Necessarily Better. *Vasc Endovascular Surg*. 2014;48(5–6):365–366. doi: 10.1177/1538574414540343
- Dorweiler B, Neufang A, Chaban R, Reinstadler J, Duenschede F, Vahl CF. Use and durability of femoral vein for autologous reconstruction with infection of the aortoiliofemoral axis. *J Vasc Surg*. 2014;59(3):675–683. doi: 10.1016/j.jvs.2013.09.029
- Langenskiöld M, Persson SE, Daryapeyma A, et al. Deep Femoral Vein Reconstruction for Abdominal Aortic Graft Infections is Associated with Low Aneurysm Related Mortality and a High Rate of Permanent Discontinuation of Antimicrobial Treatment. *Eur J Vasc Endovasc Surg*. 2021;62(6):927–934. doi: 10.1016/j.ejvs.2021.09.004
- Beck AW, Murphy EH, Hocking JA, Timaran CH, Arko FR, Clagett GP. Aortic reconstruction with femoral–popliteal vein: graft stenosis incidence, risk and reintervention. *J Vasc Surg*. 2008;47(1):36–43; discussion 44. doi: 10.1016/j.jvs.2007.08.035
- Daenens K, Fourneau I, Nevelsteen A. Ten-year experience in autogenous reconstruction with the femoral vein in the treatment of aortofemoral prosthetic infection. *Eur J Vasc Endovasc Surg*. 2003;25(3):240–245. doi: 10.1053/ejvs.2002.1835
- Kouijzer IJE, Van der Jagt MFP, Bleeker-Rovers CP, Dirven M, de Mast Q, Poyck PP. Outcome in Patients after Autologous Femoral Vein Reconstruction for Primary Aortic Infection and Aortic Graft Infection: A Case Series. *Ann Vasc Surg*. 2022;83:240–250. doi: 10.1016/j.avsg.2021.11.012
- Gibbons CP, Ferguson CJ, Fligelstone LJ, Edwards K. Experience with femoro–popliteal vein as a conduit for vascular reconstruction in infected fields. *Eur J Vasc Endovasc Surg*. 2003;25(5):424–431. doi: 10.1053/ejvs.2002.1853
- Eilenberg W, Klopff J, Domenig CM, et al. The Femoral Vein as a Long-Term Aorto-Iliac Graft for Aortic Infection and Aortitis. *World J Surg*. 2022;46(5):1235–1242. doi: 10.1007/s00268-022-06460-w
- Tsunekawa T, Utakata R, Fukumoto Y, Kubo T, Kuze F. Carotid Artery Reconstruction with an Autologous Bifurcated Saphenous Vein Graft. *Ann Vasc Dis*. 2024;17(2):211–214. doi: 10.3400/avd.nmt.23-00118