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Case Report

Successful Management of Arteriovenous Graft Stenosis and Structural Rupture with Endovascular Stent Graft Reinforcement: A Case Report

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Abstract

Chronic kidney disease is a global public health issue affecting over 10% of the population and necessitating kidney replacement therapy as it progresses to kidney failure. Hemodialysis, the most common form of kidney replacement therapy, requires well-functioning vascular access. When arteriovenous fistulas (AVFs) are not viable due to multiple failed accesses or vascular disease, arteriovenous grafts (AVGs) are often used as an alternative. This case report describes a 27-year-old female with chronic kidney disease, likely secondary to systemic lupus erythematosus, who had been on hemodialysis since the age of 14. The patient experienced thrombosis and structural rupture of an AVG. A pharmacomechanical thrombectomy was performed, followed by angioplasty to treat arterial stenosis. Due to residual thrombus and compromised graft integrity, a cell-impermeable endoprosthesis was placed within the arteriovenous graft. The patient successfully resumed hemodialysis 48 hours post-procedure.

Keywords: hemodialysis; vascular access; stenosis; arteriovenous graft; endoprosthesis

Introduction

Chronic kidney disease is a public health problem that affects over 10% of the global population [1]. As chronic kidney disease progresses from its early stages to kidney failure, morbidity, mortality, and healthcare costs increase, and life expectancy is markedly reduced unless kidney replacement therapy is initiated [2]. Nearly 4 million people globally rely on kidney replacement therapy, with hemodialysis being the most common modality [3].

Effective hemodialysis depends on well-functioning vascular access to the patient's blood circulation. An arteriovenous fistula (AVF) is currently the access of choice for hemodialysis due to its superior long-term patency and lower complication rates compared to other access types [4–6]. However, AVFs are not always viable for all patients, particularly those with multiple failed accesses or significant vascular disease [7]. When AVFs fail or are not feasible, an arteriovenous graft (AVG) is often employed as the next option, as recommended by the NKF-DOQI guidelines [4]. The use of grafts becomes necessary, especially in patients who have been on hemodialysis for several years and have exhausted other vascular access options. The most common complication of AVG is the development of stenosis, which can impair the effectiveness of hemodialysis and potentially lead to AVG thrombosis [8]. The management of these complications often requires endovascular interventions. This article presents the case of a patient with chronic kidney disease on hemodialysis who experienced thrombosis and structural rupture of the AVG. It details the endovascular techniques used to preserve vascular access and ensure the continuity of hemodialysis treatment, highlighting an innovative approach to address these complications: placing a cell-impermeable endoprosthesis inside a previously implanted graft.

Case Description

A 27-year-old female patient with chronic kidney disease, probably secondary to systemic lupus erythematosus, had been in a hemodialysis program since the age of 14. She had previously undergone two failed deceased-donor kidney transplants and experienced failure of AVF in the right upper limb. A new vascular access was created using an AVG (Haemodialysis Reliable Outflow [HeRO]; Merit Medical Systems, Inc.,

South Jordan, Utah, USA) in the left upper limb. HeRO is a mixed AVG that combines an expanded polytetrafluoroethylene (ePTFE) body with central drainage through a siliconized catheter. A titanium connector links the ePTFE body to the silicone catheter.

Following a hemodialysis session, the patient experienced localized swelling at the AVG puncture site, accompanied by bleeding from the puncture wound. A Doppler ultrasound of the vascular access was performed, showing findings consistent with an AVG rupture at the puncture site, with the possibility of endovascular treatment

The endovascular treatment was performed with the patient under general anesthesia. A 0.035 hydrophilic guidewire was used to cross the lesion site, advancing from the superior vena cava through the lesion in the venous axis. An initial puncture was performed under ultrasound guidance to gain retrograde access near the arterial anastomosis, allowing the guidewire to advance through the lesion. A pharmacomechanical thrombectomy was performed using the AngioJet™ Thrombectomy system (Solent™ 6F; Boston Scientific, Marlborough, MA, USA), with the aim of clearing residual parietal thrombi from the proximal venous axis and the HeRO graft. A total of 10mg of recombinant tissue plasminogen activator was administered using a pulse spray technique before proceeding with thrombus aspiration. After the initial thrombectomy, an angioplasty of the cephalic vein was performed using a 6 x 120 balloon (Oceanus 35; Life Vascular Devices Biotech, Barcelona, Spain).

Due to residual thrombus in the cephalic vein, a subsequent puncture was performed to gain anterograde access, allowing for a second pharmacomechanical thrombectomy of the distal venous axis and the arteriovenous anastomosis. An angiography following the thrombectomy revealed stenosis at the arteriovenous anastomosis and brachial artery. A 6 x 120 balloon (Oceanus 35; Life Vascular Devices Biotech, Barcelona, Spain) was used, successfully opening the anastomosis. However, intraoperative angiographic images showed residual thrombus in the AVG body and signs of graft integrity compromise, evidenced by leakage and irregularities in the angiographic image (Figure 1A).

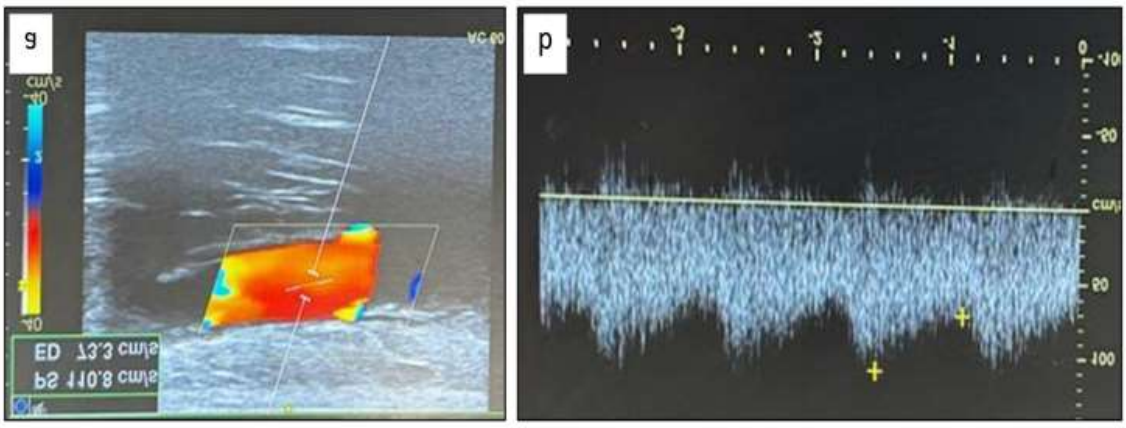

Figure 1: Angiography before and after treatment.

a) Intraoperative angiographic image before treatment showing residual thrombus in the AVG body and signs of compromised graft integrity, including a pseudoaneurysm of the arteriovenous graft (indicated by the arrow in the image). **b)** Post-treatment angiographic image showing the reopened AVG.

To address these findings and restore graft function, a cell-impermeable endoprosthesis (Wrapsody™; Merit Medical Systems, Inc., South Jordan, Utah, USA) was placed in the AVG body (within the previously implanted HeRO graft), effectively managing the complication without the need for surgical removal of the HeRO graft. Final angiography confirmed the successful opening of the venous pathway and complete anastomosis patency (Figure 1B). The patient returned to the hemodialysis regimen, undergoing a session 48 hours after the procedure. She has been followed up quarterly since then, and at her most recent visit, 10 months after the intervention, the vascular access remained patent.

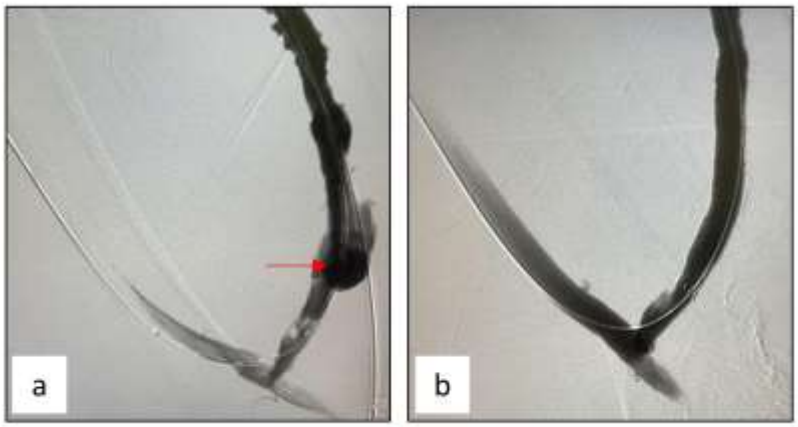

Figure 2: Intraoperative Doppler ultrasound.

a) Immediate intraoperative Doppler ultrasound showing increased blood flow and graft patency. **b)** Doppler ultrasound confirming the success of the treatment, as evidenced by the increased and adequate blood flow in the graft.

Conclusion

This case demonstrates that non-traditional treatment options are available for managing vascular access failures, such as occlusions and ruptures, especially when conventional options are limited. The placement of a cell-impermeable endoprosthesis within a previously implanted graft, as in this case, provides a viable solution that avoids graft surgical removal and allows for the preservation of vascular access. This approach supports the early return to hemodialysis treatment (two days after the procedure), minimizing interruption and improving patient outcomes. Moreover, this method aligns with the NKF-DOQI's emphasis on maximizing the use of available access sites, especially in patients with limited vascular options due to multiple failed accesses [4].

The NKF-DOQI guidelines also advocate for individualized patient care, recognizing that no single approach fits all scenarios [4]. In this case, the innovative use of an endoprosthesis exemplifies this tailored approach, providing a customized solution that accommodates the patient's unique clinical situation, thereby optimizing their overall treatment experience and outcomes. This case also highlights the importance of continued innovation and flexibility in managing vascular access, encouraging practitioners to consider all available options to achieve the best possible patient care.

References

1. Kovesdy CP. (2022). Epidemiology of chronic kidney disease: an update 2022. *Kidney Int Suppl* (2011); 12: 7–11.
2. Pecoits-Filho R, Okpechi IG, Donner J-A, et al. (2011). Capturing and monitoring global differences in untreated and treated end-stage kidney disease, kidney replacement therapy modality, and outcomes. *Kidney Int Suppl* (2020); 10: e3–e9.
3. Bello AK, Okpechi IG, Osman MA, et al. (2022). Epidemiology of haemodialysis outcomes. *Nat Rev Nephrol*; 18: 378–395.
4. KDOQI (2019). Clinical Practice Guideline for Vascular Access: Update - *American Journal of Kidney Diseases,*
5. Arhuidese IJ, Orandi BJ, Nejim B, et al. (2018). Utilization, patency, and complications associated with vascular access for hemodialysis in the United States. *J Vasc Surg;* 68: 1166–1174.
6. Almasri J, Alsawas M, Mainou M, et al. (2016). Outcomes of vascular access for hemodialysis: A systematic review and meta-analysis. *J Vasc Surg*; 64: 236–243.
7. Wish JB. (2015). Catheter Last, Fistula Not-So-First. *J Am Soc Nephrol*; 26: 5–7.
8. Kingsmore DB, Thomson P, Stevenson K. (2023). Screening and surveillance of venous stenosis in AVG: Is it time to rethink our assumptions? *J Vasc Access*; 24: 873–878.

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