

Transcollateral retrograde approach: A completely endovascular technique to preserve vascular access for hemodialysis

Abordaje retrógrado transcolateral: Una técnica completamente endovascular para preservar el acceso vascular para hemodiálisis

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ABSTRACT

Objective. Vascular access (VA) dysfunction in patients with end-stage renal disease is associated with an increased morbidity and mortality. Consequently, maintaining the existing VA sites is of utmost importance regarding hemodialysis. We describe the feasibility of the transcollateral retrograde approach (TCRA), an entirely endovascular technique to avoid the hemodialysis of the VA.

Methods. This is the case of a male patient with left upper limb edema and high venous pressure during the hemodialysis of an AV graft due to the occlusion of the post-anastomotic vein and central veins with developed collateral vessels. Since the antegrade access failed and no puncture site for retrograde recanalization was anatomically available, we adopted the TCRA strategy and completed the procedure successfully by implanting venous self-expandable nitinol stents. The angiography performed confirmed the AV patency and proper flow.

Results. In the outpatient follow-up, hemodialysis was performed uneventfully, and the patient showed the complete resolution of the left upper limb edema.

Conclusion. This fully endovascular technique turned out to be a feasible alternative to solve a dysfunctional VA.

Keywords: vascular access, hemodialysis, endovascular procedure, trans-collateral retrograde approach.

RESUMEN

Objetivo. La disfunción del acceso vascular (AV) en pacientes con enfermedad renal en etapa terminal se asocia con una mayor morbilidad y mortalidad. En consecuencia, el mantenimiento de los AV existentes es de suma importancia para la hemodiálisis. Describimos la viabilidad del abordaje retrógrado transcolateral, una técnica completamente endovascular para salvar una AV de hemodiálisis.

Métodos. Reportamos un paciente con edema del miembro superior izquierdo y presión venosa alta durante la hemodiálisis en un AV protésico debido a la oclusión de la vena posanastomótica y las venas centrales con vasos colaterales desarrollados. Debido a que el abordaje anterógrado falló y no había un sitio de punción disponible para la recanalización retrógrada, adoptamos la estrategia de abordaje retrógrado por vía transcolateral y completamos con éxito el procedimiento con el implante de stents venosos de nitinol autoexpandibles. La angiografía mostró permeabilidad y buen flujo en el AV.

Resultados. En el seguimiento ambulatorio, el paciente evolucionó con resolución completa del edema en el miembro superior izquierdo y con buena dinámica de flujo durante la hemodiálisis.

Conclusión. Esta técnica totalmente endovascular permitió una alternativa factible para rescatar un AV disfuncional.

Palabras claves: acceso vascular, hemodiálisis, técnica endovascular, abordaje retrógrado transcolateral.

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CLINICAL CASE

Sixty-three-year-old male patient with end-stage chronic kidney disease referred to our unit with left upper limb edema and higher blood pressure rates during hemodialysis through a prosthetic vascular access that was patent 13 months ago (**Figure 1A**). The direct puncture angiography of the prosthetic sector performed revealed the occlusion of the post-anastomotic vein and the central veins with the development of collateral circulation between the post-anastomotic vein and the axillary vein (**Figures 1B and 1C**). An 8-Fr introducer sheath was placed into the prosthetic sector. The antegrade approach was first tried to cross the occlusion of the post-anastomotic vein with support from a 4-Fr vertebral catheter plus a 6.8 gram 0.018 in hydrophilic guidewire and a 0.035 in stiff hydrophilic guidewire. None

of these guidewires was able to cross the occlusion and both guidewires were in the subintimal space (**Figure 1D**). Given the occlusion of the central veins, retrograde access through the patient's left internal jugular vein was not feasible. Afterwards, retrograde access was tried through transcollateral approach using a 4-Fr 0.018 in support catheter and a 6.8 gram 0.018 in hydrophilic guidewire, and the occlusion was successfully crossed. The guidewire was externalized through the introducer with a snare (**Figure 1E**).

Then, with the use of a 4-Fr vertebral catheter and a 0.035 in stiff hydrophilic guidewire the occlusion was crossed at central vein level. The antegrade access was used for high-pressure predilatation with non-compliant balloons, self-expandable nitinol venous stents, and postdilatation with non-compliant balloons (**figure 1F**).

The angiography confirmed the patency of vascular access with proper blood flow (**Figures 1G and 1H**).

RESULTS

No complications associated with the procedure were reported. During the outpatient follow-up the patient's disease progression was good with total resolution of his left upper limb edema and good flow dynamics during hemodialysis.

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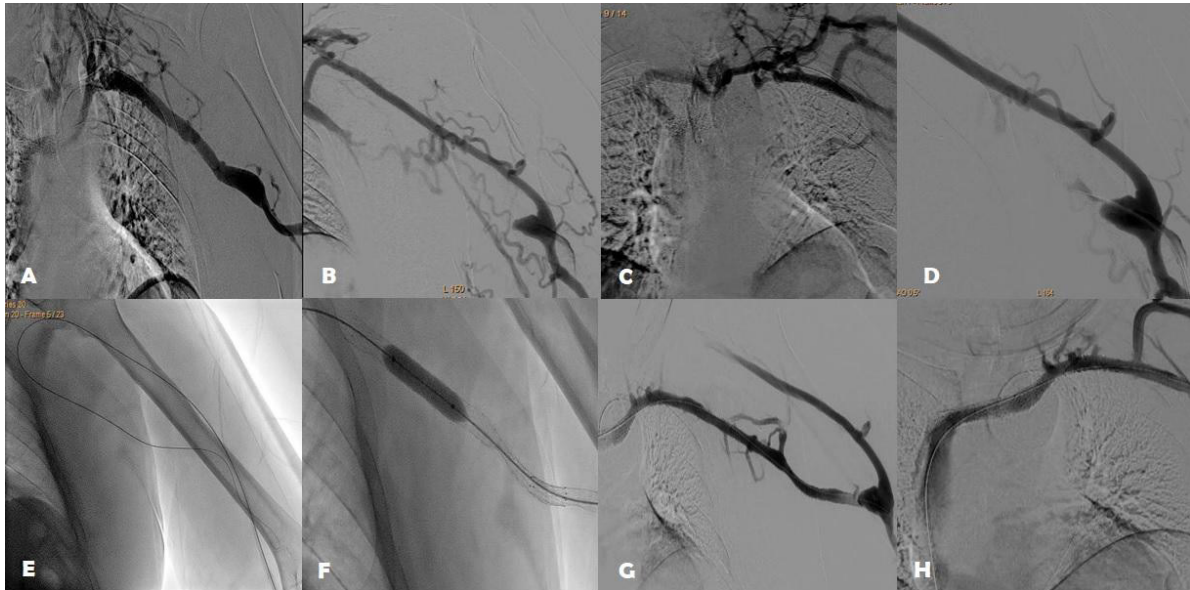


Figure 1.

DISCUSSION

Vascular access (VA) dysfunction is associated with high morbimortality rates.¹ Consequently, a proper functioning VA is essential to perform hemodialysis efficiently.² According to the Kidney Disease Outcomes Quality Initiative clinical guidelines published in 2006 and updated in 2010, the main options for the management of a dysfunctional arteriovenous or prosthetic fistula are the endovascular and surgical approaches; both are considered a good and feasible option.³ This was the case of a patient with left upper limb edema and high venous pressure during hemodialysis in a prosthetic VA due to the occlusion of the post-anastomotic vein and central veins with well-developed collateral vessels. The cause was attributed to volume overload in collateral vessels and the occlusion of central veins. Therefore, we decided to treat the vascular occlusion to alleviate its symptoms and improve the dynamics of hemodialysis.

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Since the antegrade recanalization failed and the left internal jugular access could not be used for retrograde recanalization, the retrograde access via transcollateral approach was crucial to be able to continue with the procedure.

Recently, new endovascular techniques for the management of vascular accesses for hemodialysis purposes are being used. One of these techniques is the transcollateral approach that is used for long chronic total coronary occlusions when no distal puncture site is available.⁴

In this manuscript we suggested a fully endovascular strategy to save VA for hemodialysis purposes.

CONCLUSION

This manuscript described a very complex case of VA dysfunction for hemodialysis that was successfully treated using the retrograde access via transcollateral approach. This fully endovascular technique turned out to be a feasible alternative as the bail-out strategy of a dysfunctional VA.