

FOR HIGH PRESSURE ANGIOPLASTY OF A STENOSED DIALYSIS GRAFT



FIGURE 1 Diagnostic fistulogram illustrating high grade venous outflow stenosis just beyond the vein-PTFE graft anastomosis, with collaterals bypassing the stenosis, in the upper arm of a chronic hemodialysis patient.

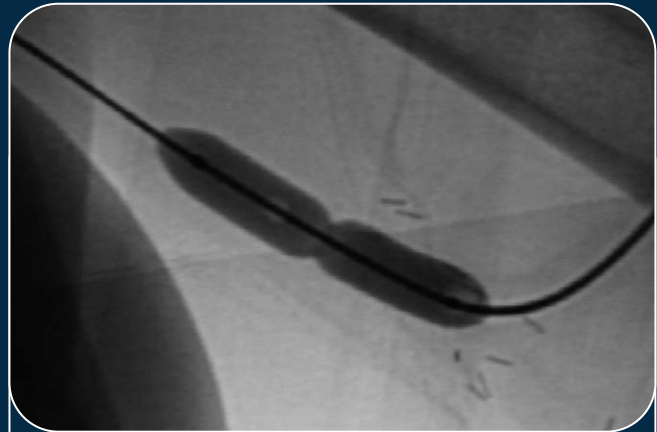


FIGURE 2 PTA with a standard 8 mm x 4 cm balloon catheter inflated to 21 atm failed to fully open the stenotic lesion, as demonstrated by the incomplete effacement of the balloon waist.

Clinical Experience

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As the number of patients dependent on chronic hemodialysis grows, efforts to extend vascular access longevity become increasingly important. Preserving vascular access patency in hemodialysis patients, reduce the number of missed hemodialysis treatments, and reduce hospitalization rates and costs associated with vascular access complications.¹ Synthetic polytetrafluoroethylene (PTFE) dialysis grafts are currently the most prevalent type of vascular access in the United States, but are prone to dysfunction due to the progressive development of intimal hyperplastic stenoses at the venous anastomosis. The most common cause of graft failure is thrombosis resulting from stenosis at the graft-vein anastomosis or along the venous outflow tract.²⁻⁴

Interventions for hemodynamically significant stenoses can reduce the rate

of thrombosis and graft loss and prolong the useful life span of a vascular access.⁵ According to the National Kidney Foundation K/DOQI guidelines, preferred treatment options for stenoses >50% luminal diameter include percutaneous transluminal angioplasty (PTA) or surgical revision;⁵ I believe the least invasive option (i.e., PTA) should be tried first and that surgery should be used in cases in which PTA fails. Endovascular techniques such as PTA have become increasingly popular because they offer several advantages over surgical methods, including the ability to perform the procedure quickly and treat the lesion *in situ*, while maintaining the graft's patency and function.^{2,4,6}

Conventional approaches involving standard angioplasty with balloon pressures between 12 and 20 atm are successful in many, but not all, cases. Failures with conventional PTA can be the result of residual stenosis due to an

inability to fully dilate the stenotic lesion or acute restenosis due to elastic recoil.^{4,7,10} Indeed, a substantial number of lesions are resistant to conventional angioplasty at standard balloon pressures; yet applying pressures >22 atm with conventional angioplasty commonly results in balloon rupture.⁸ Some rigid venous stenoses may require dilation at pressures of 30 atm, which cannot be achieved with conventional angioplasty balloons.^{9,10} In my clinical experience, most resistant stenoses can be treated successfully with ultrahigh-pressure, noncompliant PTA balloons such as the Conquest™ PTA Balloon Dilatation Catheter.¹⁰ The Conquest™ PTA Balloon offers sufficient strength for inflation to 30 atm, allowing resolution of otherwise resistant lesions. The case report presented here illustrates successful use of the Conquest™ PTA Balloon catheter in a resistant stenotic lesion.

The patient is a 64-year-old female hemodialysis patient with a left upper arm PTFE straight brachial artery to basilic vein dialysis graft. The graft had been patent for 22 months and had had no prior interventions. The patient was referred from her nephrologist for elevated pressures during dialysis and prolonged bleeding after dialysis. Abnormal pulsatility was noted on physical examination of the access, with a transition to thrill at the venous anastomosis, indicating the presence of stenosis.

A diagnostic fistulogram revealed high grade, nearly occlusive venous out-flow stenosis just beyond the venous anastomosis with collaterals bypassing the stenosis (Figure 1). Angioplasty was performed with a standard PTA balloon catheter (8 mm x 4 cm) inflated to 21 atm. As seen in Figure 2, these pressures were unable to completely open the stenotic lesion, as shown by the incomplete effacement of the balloon “waist.” The standard balloon catheter was removed and replaced with a 8 mm x 4 cm Conquest™ PTA Dilatation Catheter. Using the Conquest™ PTA Balloon inflated to 30 atm for 90 seconds, the balloon waist was fully effaced (Figure 3) and the stenotic lesion was completely resolved with restoration of a thrill throughout the graft, no significant residual stenosis, and disappearance of the collaterals (Figure 4). Pressures during hemodialysis the next day returned to normal and the prolonged bleeding resolved. The graft has remained patent for 14 months without further intervention.

In this patient, the Conquest™ PTA Balloon – inflated to 30 atm – was able to completely resolve a stenotic lesion that a conventional device inflated to 21 atm, was unable to resolve. If this stenosis had not been alleviated, subsequent clotting may have occurred, potentially resulting in access loss or the need for additional interventional or surgical procedures.

Our group has successfully used the Conquest™ PTA Balloon in over 300 dialysis-related venous stenoses for ultrahigh-pressure PTA at up to 30 atm, with no balloon ruptures. Our long-term experience is identical to our early experience.¹⁰ High-pressure angioplasty has offered us the opportunity to improve the percutaneous maintenance of vascular access in our hemodialysis patients. The Conquest™ PTA Balloon Dilatation Catheter features sufficient strength to resolve highly resistant stenotic lesions and allows us to extend vascular access life span utilizing endovascular rather than surgical techniques, even in challenging patients, like the one highlighted in this case.

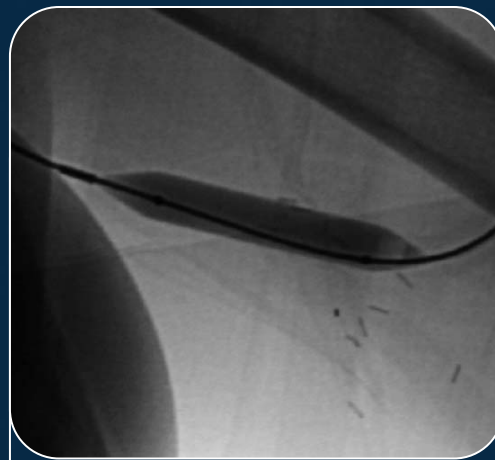


FIGURE 3 Full resolution of the resistant stenotic lesion with ultrahigh-pressure PTA using a 8 mm x 4 cm Conquest™ PTA Balloon Dilatation Catheter, inflated to 30 atm for 90 seconds. Note full effacement of the balloon waist.



FIGURE 4 Following ultrahigh-pressure PTA using a Conquest™ PTA Balloon Dilatation Catheter inflated to 30 atm, the stenotic lesion was completely resolved with restoration of a thrill throughout the graft, no significant residual stenosis, and disappearance of the collaterals.

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