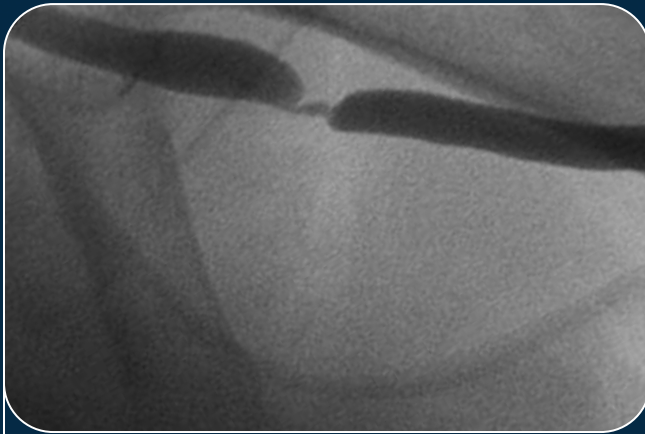


HIGH PRESSURE ANGIOPLASTY OF AN ARTERIOVENOUS FISTULA



FIGURES 1 AND 2 Venography confirms pre-occlusive proximal stenosis of the cephalic vein close to the confluence with the subclavian vein and a distal stenosis in the superior third of the arm. Some collateral vessels are evident.

Clinical Experience

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Maintenance of vascular access patency in hemodialysis patients is essential for successful chronic dialysis. Unfortunately, venous arterIALIZATION — both with arteriovenous fistulas (AVFs) and with ePTFE grafts — leads to progressive intimal hyperplasia.¹ Intimal hyperplasia is responsible for recurrent stenosis and subsequent thrombosis that compromise patency of the vascular access. One-year patency of an AVF is generally between 56% and 77%, with a 25% to 30% reduction by 5 years.² For this reason, many vascular accesses are abandoned when complications develop and a new access is constructed in other venous segments, limiting the availability of usable veins for future access needs.

Percutaneous transluminal angioplasty (PTA) of stenosed AVFs can reduce the thrombosis rate and consequent loss of vascular access. Moreover, angioplasty can be repeated on the same access, extending the survival of a problem-prone fistula.

Echo-Doppler analysis³ permits periodic monitoring of the fistula and allows identification of hemodynamically significant stenosis in the venous outflow tract as well as a reduction in flow (<600 mL/min).⁴ According to the National Kidney Foundation clinical practice guidelines, stenoses that results in $\geq 50\%$ reduction of the normal vessel diameter as well as a hemodynamic, functional, or clinical abnor-

mality should be treated to reduce the risk of thrombosis and insufficient blood flow for hemodialysis adequacy.²

Conventional intervention involves preliminary venography — using a direct approach to the venous outflow, down to the stenosis. This is followed by PTA with conscious sedation using a non-compliant PTA balloon catheter at pressures between 12 and 20 atmospheres for 60 and 120 seconds. As detailed in the case below, high pressure angioplasty with the non-compliant Conquest™ PTA Dilatation Catheter (30 atmospheres rated burst pressure) is useful in resolving difficult lesions in a stenosed AVF.

The Case

The patient is a 79-year-old male, who has received hemodialysis for 12 months due to renal failure associated with diabetes. He has an AVF in the left arm constructed from the humeral artery and the cephalic vein. The patient presented with turgescence of the cephalic vein associated with a double thrill located in the superior third of the arm and at the shoulder with signs of recirculation. Echo-color Doppler showed a reduction in blood flow (<450 mL/min) due to two stenoses located within the superior segment of the arm and close to the confluence with the subclavian vein.

Percutaneous treatment was indicated and the preliminary venography confirmed the presence of the two pre-occlusive stenotic lesions (Figures 1 and 2). Dilatation of the stenoses was completed using a 6 x 40 mm Conquest™ PTA Dilatation Catheter with a single inflation to 18 atmospheres for 60 seconds at the distal lesion and a subsequent inflation to 22 atmospheres for 120 seconds at the proximal lesion. The procedure was clearly successful (Figure 3), with normalization of flow as evidenced by Echo-color Doppler.

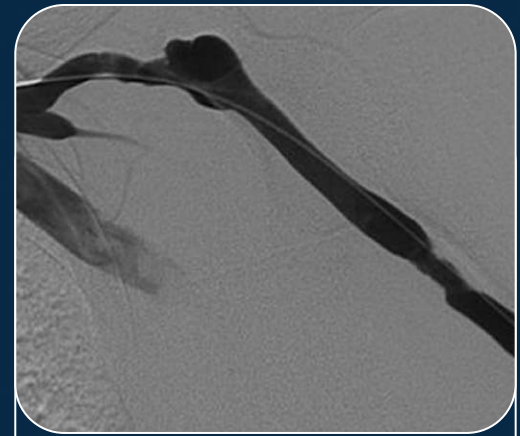


FIGURE 3 Post-procedural venography reveals resolution of the lesions following high pressure PTA with a 6 x 40 mm Conquest™ PTA Dilatation Catheter.

Discussion

Unfortunately, a high number of venous stenoses are very resistant to conventional angioplasty and are not resolved with routine pressures (12 to 20 atmospheres). Moreover, conventional PTA balloons may rupture during dilatation at higher pressures potentially damaging the venous wall.^{5, 6} Treatment of resistant lesions with cutting balloons⁷ or stents increases the treatment cost without ensuring superior primary patency, often necessitating reoperation within 4 and 14 months.^{2, 8, 9}

Based on my personal experience, treatment of many long and resistant lesions can be achieved by high pressure PTA using the non-compliant Conquest™ PTA Dilatation Catheter. The device has a rated burst pressure of 30 atmospheres, allowing successful treatment of highly resistant lesions that may require pressures of 25 to 30 atmospheres. In my experience, high pressure angioplasty with the Conquest™ PTA Dilatation Catheter provides successful results with a minimum number of inflations (maximum 2), making the procedure faster and more easily tolerated by the patient.

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