

ULTRAHIGH-PRESSURE ANGIOPLASTY OF A TRANSPOSED BRACHIOCEPHALIC FISTULA WITH RECURRENT STENOSIS



FIGURE 1 Residual stenosis following treatment of an occluded transposed brachiocephalic fistula with an 8 mm cutting balloon (Jan 2005).



FIGURE 2 Residual stenosis post-PTA with a 9 mm conventional balloon (Jan 2005).



FIGURE 3 Recurrent stenosis as presented March 2005.

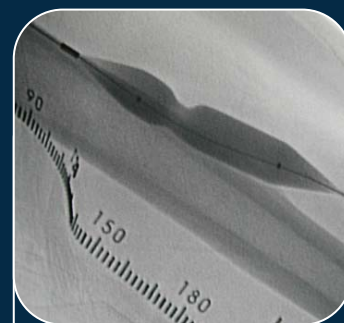


FIGURE 4 12 mm x 4 cm Conquest™ PTA Balloon Dilatation Catheter with waist (March 2005).

Clinical Experience

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Native arteriovenous fistulae are the preferred form of vascular access for long-term maintenance hemodialysis.¹ Fistula failure may subsequently occur due to stenosis, and treatment of significant stenosis is recommended to maintain patency of the vascular access. Percutaneous transluminal angioplasty (PTA) of the stenotic lesion can allow salvage of the fistula.²

Recurrent stenosis in an arteriovenous fistula can be difficult to treat. These lesions are commonly resistant to conventional angioplasty, and other methods such as ultrahigh-pressure PTA^{3,4} or cutting balloon angioplasty^{5,6} may often be required to dilate these lesions effectively. The following case illustrates the use of both of these methods in the same lesion

during separate interventions, eventually resulting in a successful outcome.

The patient was a 41-year-old male with dialysis-dependent renal failure secondary to chronic hypertension. In April 2003, he underwent creation of a left native arteriovenous fistula utilizing the brachial artery and cephalic vein with transposition of the cephalic vein. This arteriovenous fistula functioned well for dialysis until January 2005, when decreased flow and increased venous pressures were noted. The patient was referred to Vascular and Interventional Radiology at Inova Fairfax Hospital for therapeutic intervention. A critical stenosis of the outflow vein was discovered and dilated, initially with a standard angioplasty catheter and then with an 8 mm cutting

balloon because of a residual stenosis (Figure 1). Due to persistent stenosis, a 9 mm standard angioplasty balloon was subsequently used. After this procedure, a 30% stenosis remained (Figure 2).

In March 2005, the patient returned to Vascular and Interventional Radiology due to decreased flow rates and periodic occlusion during dialysis. A fistulogram was performed, demonstrating a high-grade recurrent stenosis (Figure 3) in the same location as the original study two months earlier. The vein was measured with an external marker and was treated with an ultrahigh-pressure 12 mm x 4 cm Conquest™ PTA Balloon Dilatation Catheter (20 atm rated burst pressure; Figure 4, Figure 5). A competitive draining vein (Figure 6) was

embolized with platinum fibered microcoils. A follow-up fistulogram demonstrated no residual stenosis and there was a strong thrill through the fistula (Figure 7). One month following the repeat intervention, the patient was doing well. Review of dialysis records revealed consistent blood flow rates during dialysis with normal venous pressures.

Discussion

This case illustrates several points. First, suboptimal angioplasty can contribute to early access failure and should not be accepted other than in the rare situation where complications preclude further treatment.^{1,7} Second, measurement of the target vein is critical to achieve optimal dilatation.⁸ This is even more important with aggressive treatments such as cutting and high-pressure balloons. In this case, the 8 mm cutting balloon — a more expensive option than other angioplasty balloons⁹ — was clearly undersized for the 12 mm vessel and unlikely to achieve a good result.¹⁰ Finally, the lesion was resistant to the use of conventional high-pressure balloons and an appropriately sized ultrahigh-pressure Conquest™ balloon was successfully used. The patient continues to do well at one month following this intervention.

The Conquest™ PTA Balloon Dilatation Catheter (up to 30 atm rated burst pressure) has become an important tool in the treatment of resistant fistulae and graft stenoses. It is a relatively inexpensive way to eliminate residual stenoses that can otherwise lead to premature access failure.

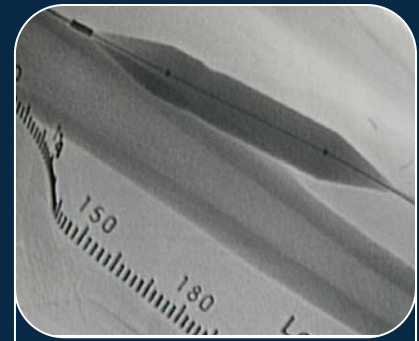


FIGURE 5 Successful PTA with Conquest™ PTA Catheter at ultrahigh pressure (March 2005).

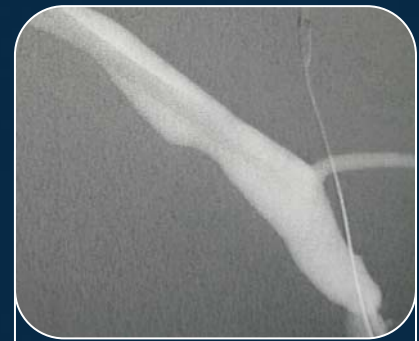


FIGURE 6 Competitive draining vein (March 2005).



FIGURE 7 Post-PTA and embolization of competitive draining vein; strong palpable thrill at this point (March 2005).

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