Post-Interventional Brescia-Cimino Arteriovenous Fistula (AVF) Evaluation.

Case Report

Full Story

A patient with an established radiocephalic arteriovenous fistula (AVF) for use in treatment of chronic renal failure presented to the vascular lab with a recent history of diminished volume exchange during hemodialysis. The dialysis technician also reported difficulty in cannulating the fistula particularly along its mid portion. Initially created three years ago, the patient had undergone two prior revisions of the fistula: balloon angioplasty with stent placement in the mid-portion of the conduit approximately one year ago and a more recent stent placement just above the distal arterial anastomosis.

Triplex examination of the entire AVF with a high frequency linear array transducer utilizing 18 MHz compound spatial harmonic capabilities demonstrated adequate in-flow through a widely patent radial artery (Figure 1) and normal flow through the distal AVF stent (Figure 2). In the more proximal mid-arm stent, a mild in-stent stenosis with elevated peak systolic velocities and slightly diminished post-stenotic flow was noted (Figure 3). However, venous outflow was deemed to be adequate for continued use of the fistula (Figure 4). Observation of puncture marks overlying the mid-arm stent suggested that the difficult cannulation was due to attempts to pass the needle through the stent wall.

ZONE Sonography™ Technology (ZST), the underpinning technology in all of ZONARE's ultrasound imaging platforms, is ideally suited for evaluation of the complex hemodynamic states found in vascular access methods used for hemodialysis. The ability to utilize very high frequency acoustic energies while maintaining adequate penetration and exceptional temporal resolution yields both B-mode and Doppler information requisite for rapid and accurate assessment of both autogenous arteriovenous fistulae and synthetic (polyurethane) grafts. Traditional beamformer ultrasound imaging systems must

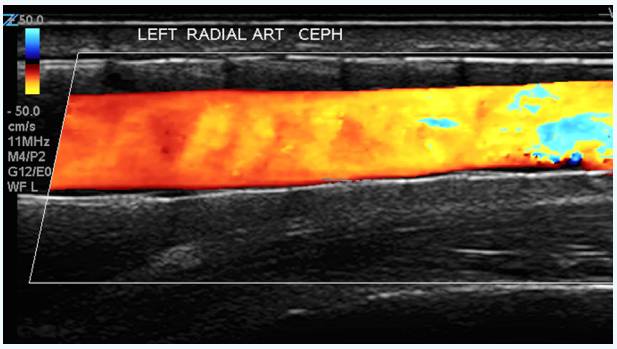

Figure 1.
Longitudinal color Doppler image through a widely patent radial artery (in-flow).

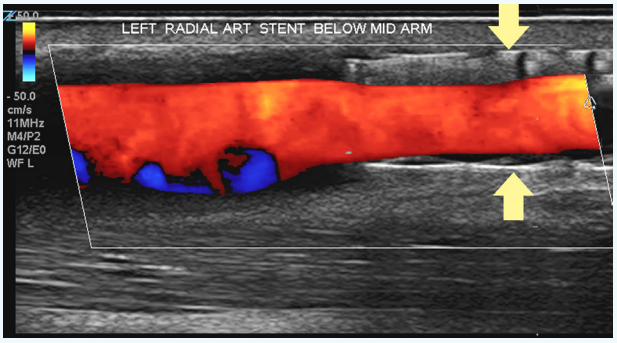

Figure 2.
Color Doppler image through the distal stent (arrows) demonstrating wide patency.

compromise temporal resolution at the expense of spatial resolution and/or color Doppler sensitivity. Advanced Acoustic Acquisition™, a technological pillar of ZST, employs extremely fast digital signal processing methods and utilizes the complete acoustic data set to permit unmatched, precise triplex imaging, an uncompromising approach to all vascular ultrasound applications.

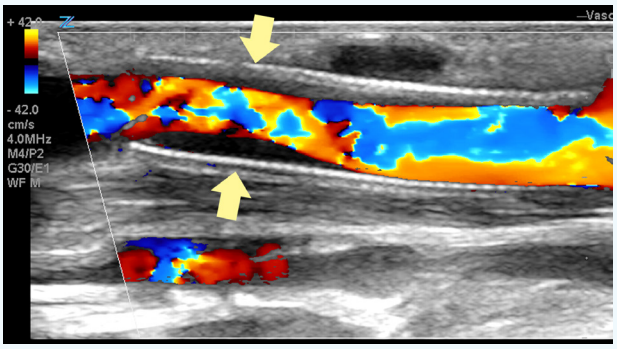

Figure 3.
Color Doppler image through the mid-arm stent demonstrating mild in-stent stenosis (arrows).

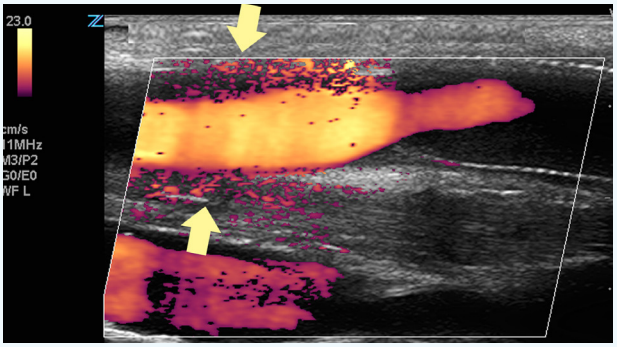

Figure 4.
Power Doppler image demonstrating adequate venous outflow from the mid-arm stent (arrows). A typical color Doppler bruit is seen in the adjacent soft tissue.

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