Volume Flow in Arteriovenous Fistulas Using Vector Velocity Ultrasound

Volume flow in arteriovenous fistulas for hemodialysis was measured using the angle-independent ultrasound technique Vector Flow Imaging and compared with flow measurements using the ultrasound dilution technique during dialysis. Using an UltraView 800 ultrasound scanner (BK Medical, Herlev, Denmark) with a linear transducer, 20 arteriovenous fistulas were scanned directly on the most superficial part of the fistula just before dialysis. Vector Flow Imaging volume flow was estimated with two different approaches, using the maximum and the average flow velocities detected in the fistula. Flow was estimated to be 242 mL/min and 404 mL/min lower than the ultrasound dilution technique estimate, depending on the approach. The standard deviations of the two Vector Flow Imaging approaches were 175.9 mL/min and 164.8 mL/min compared with a standard deviation of 136.9 mL/min using the ultrasound dilution technique. The study supports that Vector Flow Imaging is applicable for volume flow measurements.

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