



Vascular Access Flow Surveillance is a medical imperative for the 21st century. It prolongs life, restores health, reduces pain and suffering in End Stage Renal Disease patients. Ultrasound transit-time indicator dilution flow technology is used to perform this surveillance of the patient's link to life, their vascular access.

*"Adequate blood flow in peripheral hemodialysis fistulae and grafts is vital to the success of hemodialysis and to survival of the patient. Access flow can therefore be considered a fundamental property of the access that should be monitored."*⁵

*"The maintenance of a reliable hemodialysis vascular access remains one of the major problems in adequate outpatient hemodialysis."*¹ Vascular access surveillance allows the nephrologist to reduce the disabling consequences of stenosis.

Prevention of Fistula Thrombosis

Another key quality of care issue in maintaining a patent vascular access includes the prevention of fistula thromboses. Minimizing these complications will not only minimize hemodialysis patient morbidity but will also ensure adequate vascular access.¹ Having a vascular access surveillance protocol increases the vascular access "life-span as a result of prospective monitoring and intervention," while reducing the "number of inpatient hospital days for vascular access problems."³ In a study conducted by Renal Care Group, Vascular Access Blood Flow Monitoring "decreased fistula thrombosis rate by at least 50%, while reducing access related costs by 48.5%."⁷

Potential Cardiac Overload

In addition to identifying decreased vascular access blood flows due to stenosis, identifying high flows is also important. High flows in AV fistulas can cause potential cardiac overload. Increases in access blood flow are "partially achieved by stealing blood from other organs,"² resulting in a decrease in systemic blood flow. Identifying these situations allows for the nephrologist to prescribe banding of the access to avoid cardiac complications.

Preferred Method

The K/DOQI Guidelines lists indicator dilution as the preferred method of access surveillance for both AV grafts and fistulas.⁶ *"Ultrasound indicator dilution uses an indirect method that does not require exposure or physical manipulation of the access itself. This is a major advantage because access to the shunt or fistula is usually limited by the needles inserted during hemodialysis when flow is most conveniently measured."*⁵

"Vascular access function is essential for the successful treatment of patients with end-stage renal disease on hemodialysis." Vascular access complications are responsible account for more than 25% of hospital admissions.⁷

Preservation of these accesses "may help reduce the incidence of hospitalization in the ESRD population and thereby lower the cost of providing care for this group. More importantly, early recognition of a malfunctioning access could prevent inadequate hemodialysis delivery."⁴

Case Study

Mary Christensen moved to the senior citizens residence after her husband died. The move had been traumatic. Mary felt uprooted, having left behind friends and the home she and her husband had shared for 42 years in order to be closer to her only child. One constant remained despite her new surroundings. Three times a week she would be driven to the dialysis clinic for hemodialysis. On one hand, she welcomed the treatments because she would feel better for a day or so. Every time, though, she returned to her room drained.

Mary's stoicism was admired by many of her fellow residents. Around her daughter, the caregivers and friends, she portrayed a brave front. It was only with her chaplain that she shared her terror that, at any given moment, her vascular access would fail. It had failed once before she came the residence. That time she has been lucky. They were able to surgically create another access.

Her fear was justified. One day she was rushed from the dialysis unit to the hospital for emergency surgery. The first surgery wasn't successful. Another surgery followed. Mary had a reprieve, a few more months to live. But it was only months. In less than a year, she was again in the hospital without a patent access. That time she succumbed to the kidney failure that had plagued her for the past seven years.¹

Mary fell victim to a medical system that did not put the patient first! The technology that would have provided monthly vascular access flow surveillance to predict stenosis had been demonstrated to the clinic and was available for their use. Monetary concerns had inhibited its implementation. Mary's life undoubtedly would have been prolonged by routine vascular access surveillance.²

References

- ¹Swab, Bollinger et al, "Prevention of Hemodialysis Fistula Thrombosis. Early Detection of Venous Stenoses," *Kid Int'l* 1999; 36:707-711.
- ²Depner, Krivitski, "Influence of Access Blood Flow (AF) on Systemic Blood Flow in Hemodialysis Patients," *JASN* 1997; 8:155A
- ³Sullivan, Besarab, "Hemodynamic Screening and Early Percutaneous Intervention Reduce Hemodialysis Access Thrombosis and Increase Graft Longevity," *Journal of Vasc and Interventional Radiology* 1997; 8(2): 163-170.
- ⁴Wang, Levin et al, "Predictive Value of Access Blood Flow in Detecting Access Thrombosis," *ASAIO J* 1998;44(5) M555-M558.
- ⁵Depner, Krivitski, "Clinical Measurement of Blood Flow in Hemodialysis Access Fistulae and Grafts by Ultrasound Dilution," *ASAIO J* 1995;41: M745-M749.
- ⁶McCarley, Ikizler et al, "Monthly Vascular Access Blood Flow Monitoring (VABFM) Reduces A-V Graft Thrombosis Rate and Associated Costs," *JASN* 1999;10: 206.
- ⁷Duda, Bander et al, "A Multidisciplinary Vascular Access Care Program (VACP) Enables Implementation of Dialysis Outcomes Quality Initiative (DOQI)," *JASN* 1999;10: 206A.