Reducing dialysis catheters:
A smart approach to quality care

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Good vascular access continues to be a cornerstone of optimal hemodialysis (HD) for patients with end-stage renal disease. Central venous catheters (CVC) are most frequently used to establish the initial vascular access in ESRD patients requiring HD. Data from the most recent United States Renal Data System (USRDS) report indicates that the use of CVCs continues to be as high as 80% in new ESRD patients requiring HD. However, CVC use is associated with inflammation, infection, thrombosis, stenosis, and catheter malfunction, which leads to significant morbidity and mortality in HD patients. Avoidance of catheters as the initial and ongoing vascular access has been advocated to reduce the high burden of catheter-driven complications. Despite the high patient morbidity and mortality, the use of CVC is not reduced for vascular access.

Clinical characteristics of patients, social situation, financial circumstances, and practice processes dictate both the dialysis modality and the type of HD vascular access used. Practice process issues include delayed referral to nephrologists, an inadequate pre-HD preparation time, and poor access to surgery to create other types of vascular access such as arteriovenous fistulae (AVF) and arteriovenous grafts (AVG). The USRDS data also suggest that, among HD patients who received care from a nephrologist for more than a year before starting dialysis, more than 40% initiated dialysis with a CVC. On the other hand, 43% of patients starting ESRD therapy who had not seen a nephrologist before initiation had to start dialysis with CVC.

Why is the CVC the path of least resistance?
Several factors hinder nephrologists’ efforts to reduce the CVC use for HD initiation. For instance, nephrologists were consulted in the hospital on patients with ESRD who are deemed to need a “temporary” CVC for HD; however, many such patients never recover kidney function and require permanent dialysis. Thus, the “temporary” CVC becomes the “permanent” catheter. The patient has now become accustomed to the CVC as the vascular access even after transitioning from acute to chronic HD and poses a challenge in acquiring permanent access. In addition, some health insurance plans may not allow simultaneous reimbursement for CVC placement as temporary access and AVF or AVG creation as the permanent access during the same hospitalization. Moreover, currently, there is no long-term data available that distinguish patients with “planned” versus “urgent” HD starts in order to assess trends in CVC placement.

Renal Ventures Management developed innovative programs to reduce the use of CVC at several points along the
patients’ continuum of care. These programs include the Renal Ventures Kidney Care Program (RV Kidney Care), Renal Ventures Team Linked Care (RVTLC), and Renal Ventures Coaching for Actions, Results and Empowerment (RVCARE). The RV Kidney Care program is geared for Stage 4 and 5 chronic kidney disease patients upon referral from a physician’s CKD practice. RVTLC is for patients starting dialysis in the hospital and the RVCARE program deals with new dialysis patients during their first 120 days after starting dialysis. The primary objective of these RVM programs is to prevent the need for CVC while achieving improved outcomes.

**RV Kidney Care**

The RV Kidney Care program involves either individual or group education and care coordination for patients with stage 4 and 5 CKD. More specifically, patients nearing the need for HD are provided with education by a multidisciplinary team, and followed by a care partner who works as a health coach and facilitates needed resources for the patient to take appropriate action in preparation for the initiation of HD. This program was initiated by RVM to achieve better clinical outcomes by reducing the use of CVC and having more patients start HD with a functioning permanent access. Physicians at RVM clinics refer their office patients with Stage IV and V kidney disease to RV Kidney Care program where the patients undergo counseling with a series of group classes or individual sessions. The care partner provides coaching in order for patients to understand the material presented in the class sessions and help make a decision on treatment modality. While working closely with patients, their families, health care team and the physician office, the care partner coordinates appointments with a surgeon to determine appropriate access placement. In addition, patients receive counseling on access care and overall care of their general health condition.

At the initiation of HD, patients will be transitioned out of the RV Kidney Care program. In 2014, 170 patients successfully completed the program and among several positive outcomes, patients started dialysis with a functioning permanent access at a significantly higher rate than the national average. As shown in Figure 1, the use of CVC at the initiation of dialysis is six fold less than national average.

**RVTLC program**

When dialysis is initiated at the hospital, following a nephrologist’s consult, a care partner from RVM educates the patient and the family at the hospital bedside and coordinates access placement through the RVTLC program. The critical role of the care partner is to provide treatment modality education to the patient and family members, coach them in making a decision on dialysis modality, and assist the nephrologist in coordinating access placement prior to patient being discharged from the hospital. In 2014, a total of 41 patients were educated in three hospitals where the program was piloted, and 28 of these patients transitioned to RVM clinics. Of those whose were transitioned to RVM clinics, 78% of the patients had permanent access placed prior to discharge from the hospital (Figure 2). Catheter only access was 22% at the initiation of dialysis, which is one third of the national average. Due to the positive results, this program is expanded in 2015 to other affiliated hospitals and RVM clinics in the Dallas region.

**RVCARE**

ESRD patients are at their most vulnerable state when starting HD, with a mortality rate as high as 42% during the first two months. Initiating HD with a catheter access increases patients’ risk of mortality by two-fold. To improve these clinical outcomes, RVM has implemented
the RVCARE program with the goal to reduce mortality in incident patients. When the HD is initiated at one of the RVM facilities, patients are enrolled into the program within the first week of treatment and access needs are addressed. To accomplish better clinical outcomes, the care partner educates the patient on access care, coordinates the permanent access placement, and helps patient use the necessary resources for timely transitioning to permanent access and removal of CVC, if present.

In 2014, 511 patients successfully completed the RVCARE program and benefited with favorable clinical outcomes. The CVC rate was reduced by half at four months when the patients were transitioned to permanent access (see Figure 3). Through a low CVC rate and other positive clinical outcomes, RVM decreased mortality rate among incident patients to only 3%, which is 10 fold less than that reported by USRDS at month 4 of starting dialysis (see Figure 4).

**Conclusions**

The best vascular access allows a safe approach while providing sufficient blood flow to perform HD and avoid complications such as infection and inflammation. To achieve better vascular access and to reduce the CVC use, RVM developed innovative measures using three unique programs, RV Kidney Care, RVTLC and RVCARE. Collectively, these programs provide intensive education, coaching, and coordination of care involving a multidisciplinary team as the integral part of CKD management. Implementation of these RVM programs resulted in better outcomes with a considerable reduction in CVC use in HD patients. Our results support the notion that special attention should be given at stage IV and V kidney disease patients to reduce the potential risk associated with the additional morbidity and mortality associated with CVC. The health care team should employ creative methods to improve patient adherence and self-management which leads to the reduction of CVC use in ESRD patients.

**References**


