Nephrology Nurses in a New Role: Diagnostic and Interventional Nephrology

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Patients with end stage renal disease (ESRD) require interventions from the time they are diagnosed with chronic kidney disease (CKD) and throughout their lives on renal replacement therapy. Diagnosis and treatment of these patients may require both invasive and non-invasive procedures, which have traditionally been performed by radiologists, surgeons, and interventional radiologists. This approach is frequently accompanied by delays in treatment due to other physician’s busy schedules and the need for “triage” of many different levels of care provided by these groups. Quite often, the needs of the ESRD patient do not receive highest priority. In recent years nephrologists have recognized the need for improvement in the procedural aspects of nephrology care and especially a more timely response to the nephrology patient’s needs (Asif, Byers, Vieira, Preston, & Roth, 2002; O’Neill, 1997; Nass & O’Neill, 1999).

Some have responded by obtaining training in nephrology-related procedures, commonly referred to as “diagnostic and interventional nephrology” (DIN) and are providing this aspect of patient care themselves (Asif et al., 2002; O’Neill, 1997; Nass & O’Neill, 1999; Asif, Byers, Vieira, & Roth, 2003; Gadallah et al., 1999; Ash, 1993; Asif, Byers, Gadalean, & Roth, 2003). In the year 2000, our university initiated a DIN program.

The program for renal ultrasound, renal biopsy and peritoneal dialysis (PD) catheter access placement was offered first, followed by tunneled catheter placement and removal, angiography and percutaneous balloon angioplasty, declotting of arterio-venous (AV) access and vein mapping in preparation for placement of hemodialysis (HD) access (Asif et al., 2003; Asif, 2003). In addition to the interventional nephrologist performing the procedures, nursing support is needed to assist in the pre-, intra- and postprocedural care. At the University of Miami School of Medicine, nephrology personnel have partnered with our interventional nephrologists to establish and maintain our program. This article describes DIN components, highlights the advantages of such a program in a university setting, and discusses the involvement of nephrology nursing personnel in the administration of care in a DIN program.

History of Nephrology-Related Procedures at Our Center
As patients with CKD are identified, a variety of nephrology-related procedures may be needed. These include renal ultrasound and possibly, renal biopsy. If a CKD patient progresses to ESRD, choices for renal replacement therapy (RRT) such as transplant, PD, or hemodialysis are offered by the Kidney Patient Educator (KPE), who is a nephrology

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nurse, as well as other members of the nephrology team. In the event of the need for urgent dialysis, a temporary or tunneled catheter must be inserted. If the patient chooses dialysis (PD or HD) over transplant, an access must be created and maintained. Commonly performed maintenance procedures for arteriovenous AV access include angiography and percutaneous balloon angioplasty and declotting of a clotted AV access (Beathard & Marston, 1998; Beathard, Settle, & Shields, 1999; Beathard, 2002).

Historically, at our center, each of these interventions had been referred to departments outside of nephrology. Diagnostic ultrasounds and ultrasound-guidance for renal biopsy were performed by radiologists, PD catheter placement and removal and hemodialysis access procedures were referred to surgeons, and AV access procedures to interventional radiologists for endovascular procedures and tunneled catheter placement.

Before the inception of our DIN program, typical wait time for scheduling of renal ultrasounds and renal biopsies was 1-2 weeks (Asif et al., 2003). Patients were required to be transported to the radiology suite for the procedure, increasing the cost, introducing delays and causing inconvenience to the patients. Since our DIN program has been in place, diagnostic ultrasounds as well as renal biopsies are performed at the bedside. Scheduling has been simplified since we need only to contact the interventional nephrologist, who performs the procedure, usually within 24 hours, and often the same day (Asif et al., 2003).

At our center, patients choosing PD routinely had to wait 1-2 weeks for an appointment with the surgeon and 2-4 weeks to be scheduled in the operating room for catheter placement (Asif et al., 2003). Surgically-placed catheters were maintained subcutaneously for 6 weeks before being exteriorized surgically. Hence, patients’ wait time until PD could be initiated was typically over 3 months and included 2 surgical procedures. The primary objective in initiating a DIN program was to provide timely PD access to patients choosing this form of renal replacement therapy. We also wished to avoid general anesthesia due to its inherent increased mortality, operating room restrictions, and other delays in patient scheduling (such as getting “bumped” from the general surgery schedule due to more serious or emergency surgery). After the development of our DIN program and the initiation of performance of PD access procedures by the interventional nephrologist, our typical time between when a patient chooses PD and receives a PD catheter has been shortened from 4-6 weeks to only 1 week (Asif et al., 2003). Since our catheters are placed peritoneoscopically, a shorter post-op healing period is required. Although PD catheters placed in this manner can be used immediately, we generally elect to wait 2-3 weeks to allow for complete wound healing, making the total wait time for initiation of PD about 3 to 4 weeks instead of the 3-month wait incurred previously.

Endovascular procedures were the most recent addition to our DIN program. A vascular access center operated by nephrologists within the dialysis unit provides a variety of procedures (Asif et al., 2003; Asif, 2008). These include placement and removal of tunneled catheters, angiography and percutaneous balloon angioplasty of arteriovenous access, declotting of AV access, and vein mapping for placement of a vascular access. This approach has significantly reduced the delays in the delivery of care and improved patient convenience. Since the access center is within the dialysis unit, the access issues are promptly addressed. Patients requiring percutaneous balloon angioplasty can choose to have their procedure on the day of dialysis. The access maintenance is performed and the patient then walks out to the unit for the dialysis treatment. Alternatively, a patient can schedule the intervention on a nondialysis day for his or her convenience. Declotting of a thrombosed access and tunneled catheter insertion are performed within 24 hours of the referral and the patient can be dialyzed immediately afterward.

Nephrology Nursing Roles in a DIN Program

Since the existence of renal replacement therapy, nurses have played an important role and quickly developed nephrology nursing as a subspecialty to care for this challenging group of patients. Today there are many possibilities for exploration of new areas of practice for nephrology nurses as DIN centers are created across the country. Nephrology nurses have been integral to both our center’s PD access program and the endovascular procedures.

Nursing roles in PD access procedures. The PD program begins with CKD patients who are nearing ESRD. These patients receive vital information regarding their options for replacement of kidney function. The KPE is in attendance for the weekly CKD clinic so that patients may receive this information during their wait time at the clinic. A video presentation explaining the basics of PD and HD is available for viewing during the clinic, and any patient who demonstrates interest is given an appointment for a one-on-one session with the KPE. During this session, the KPE presents the advantages and disadvantages of each renal replacement therapy (RRT) alternative (PD, HD, and transplant). Patients who choose PD are given opportunities to have their questions answered and are referred to the interventional nephrologist, who is also present during the clinic. If HD is chosen, a referral can be made for venous mapping for vascular access, when appropriate. Nursing intervention continues as the patient moves through the system. A nephrology nurse practitioner coordinates the admission of patients requesting PD access. This nurse is a central figure in the day-to-day administration of the hospital-based procedure room where catheters are placed and is a member of the interventional team performing the surgery. As part of this team, the nurse may assist in the surgical procedure, monitor the patient during surgery, and/or administer conscious sedation under the supervision of the nephrologist. The nurse also plays a major role in the pre and postoperative care of these patients. A critical care background is helpful in this...
position, though not a must. Advanced cardiac life support (ACLS) training and conscious sedation certification are required.

Nursing roles in endovascular and tunneled catheter procedures. Commonly performed endovascular procedures include percutaneous balloon angioplasty for vascular access dysfunction, declotting procedures for a thrombosed arteriovenous access, and vein mapping for vascular access placement (Asif et al., 2003; Beathard & Marston, 1998; Beathard, Settle, & Shields, 1999; Beathard, 2002). The diagnosis of an AV access problem usually is made in the dialysis unit. Our nephrology nurse is part of the team available to take referrals and communicate with the other team members in order to schedule procedures appropriately and then to perform procedures as needed. Nursing roles in this area include patient monitoring, administration of conscious sedation under the supervision of the nephrologist, assisting on the procedure and recovery, and discharge of the patient. In these roles the nurse must be familiar with the tools for angioplasty (balloons, wires, sheaths), the equipment and tools for declotting (mechanical thrombolysis machine and associated equipment), and the procedure for assisting with vein mapping.

Tunneled catheter procedures may include placement, removal, or repositioning of a catheter (Work, 2002). The nurse takes the same roles as listed formerly in these procedures and must be familiar with any and all types of tunneled catheters used as well as the procedures themselves.

The nephrology nurse in this area must also have ACLS training and conscious sedation certification, as well as radiation safety training. In our center, the patient having any procedure in the endovascular suite is admitted, monitored, and recovered following the treatment by the nephrology nurse. This nurse also serves as a liaison with the dialysis staff, answering questions, providing information regarding the substance of the patient’s procedure, and involving the interventionist where needed.

Conclusion
Research has shown that when appropriately trained interventional nephrologists become involved in the procedural needs of their patients, continuity of care is improved and the delivery of this care is more efficiently provided. As in all aspects of nephrology care, nursing involvement is very important. As DIN centers are created, nephrology nurses who are interested in this emerging subspecialty will have new opportunities to be involved in many aspects of their development and administration.

References