Growing a Peritoneal Dialysis Program From 2 to 30 Patients in 2 Years

Editor:

Peritoneal dialysis (PD), in the absence of transplant as an immediate option, is considered the preferred modality for initiating renal replacement therapy (RRT) in end-stage renal disease (ESRD) because of equal or improved survival during the first 2 years compared to hemodialysis (HD) patients, convenience of home therapy, better patient satisfaction and overall lower cost (as much as \$20,000 per year) (1,2). Despite this, PD therapy is underused due mainly to inadequacies of infrastructure, patient education and provider familiarity. We report our experience of growing the PD program from 2 to 30 patients in 24 months at University Health System (UHS), with the aim of providing a strategy to build a successful PD program.

University Health System is a tertiary care academic medical center in partnership with University of Texas Health Sciences Center at San Antonio serving mainly the indigent and uninsured population, and has its own free-standing dialysis clinics (serving 450 patients). In 2011, the existing PD program had only 2 patients as a consequence of administrative and personnel vicissitudes. A newly trained nephrologist with a strong interest in PD took over and the following steps were taken to revamp the program. First, an enthusiastic and experienced PD nurse was hired. Second, agreement was reached with motivated interventional radiologists (IR) and nephrologists (IN) to provide timely PD catheter placement service in addition to the existent surgical support. Third, the RRT education program was reorganized by an access nurse which mandated education about all replacement modalities, not only for patients followed in the outpatient clinic but also for those who started chronic dialysis in the inpatient setting, since at UHS many patients are seen for the first time in the emergency room with end-stage uremic manifestations. Interested patients with no contraindication to PD were invited to participate in a multidisciplinary PD conference attended by a nephrologist, a nurse, a dietitian, a social worker and frequently by other dialysis patients. This visit helped the patients overcome many of the fears and concerns about the modality.

Table 1 shows the number and dialysis-related characteristics of the patients started on PD over the next 2 years. Figure 1 demonstrates the process of patient recruitment to the PD program from the existent HD program, inpatient setting and outpatient renal clinic. Due to insufficient inpatient nursing support, urgent PD

start had not been an option. With increased education and awareness of the program, the number of patients starting PD as an initial dialysis modality nearly tripled from the first to second year. To retain the PD patients, aggressive strategies and protocols were applied for peritonitis prophylaxis, prompt treatment of infection and catheter malfunction, membrane preservation using angiotensin-converting-enzyme (ACE) inhibitors, and adjustment of dialysis prescription according to residual renal function. Faced by the growth of the program and a shortage of experienced PD nurses, a dialysis nurse naïve in PD was recruited and trained for PD. During the first year, 1 patient switched to HD due to herpetic encephalitis disabling his capabilities to perform exchange and 1 died due to drug overdose. Over the second year, 8 patients switched to HD due to either refractory ovarian abscess, peritonitis, loss of housing, recurrent hernia, family fatigue in a blind diabetic patient, catheter malfunction, bladder cancer requiring extensive abdominal surgery, or volume overload from treatment non-compliance. Table 2 shows the PD-related complications: peritonitis rates were at par with International Society for Peritoneal Dialysis guidelines. The rates of catheter malfunction, pericatheter leak, and

TABLE 1
Dialysis-Related Patients' Characteristics

	1 st year	2 nd year	Total
Total new starts (<i>n</i>)	18	20	
Existing patients (<i>n</i>)	2		
Source of patients (<i>n</i>)			
Transfer from HD (>12 months)	4	1	5
Transfer from HD (1–6 months)	7	5	12
PD Directly	5	14	19
Transfer from other PD centers	2	0	2
Pre-dialysis care (not including transfer from HD for >1 year or PD transfer)			
>12 months	3	8	11
0–12 months	4	6	10
None	5	5	10
Catheter placement (<i>n</i>)			
General surgeon	12	4	16
Interventional radiology	0	5	5
Interventional nephrology	4	11	15
Loss of patients (<i>n</i>)			
Transfer to HD	1	8	9
Death	1	0	1
Total remaining (<i>n</i>)	18	30	

HD = hemodialysis; PD = peritoneal dialysis.

Figure 1 — Instituted steps for patient recruitment into the PD program from existent HD program, inpatient setting and outpatient renal clinic. HD = hemodialysis; ER = emergency room; CKD = chronic kidney disease; RRT = renal replacement therapy; TDC = tunneled dialysis catheter; PD = peritoneal dialysis; IR = interventional radiologist; IN = interventional nephrologist; cath = catheter.

TABLE 2
Frequency of Peritoneal Dialysis-Related Complications

	1 st year	2 nd year	Total
Peritonitis (n)	9	15	24
One peritonitis/patient-month	17.11	19.45	18.8
Exit-site infections (n)	7	4	11
Catheter malfunction requiring intervention (n)			
Surgeon placed	1	1	2
Interventional radiologist placed	0	2	2
Interventional nephrologist placed	0	1	1

infection were the same for surgically or radiologically placed catheters.

Despite its advantages over HD, as of 2008, the prevalence of PD patients was only 7.2% in the United States due to a multitude of factors. We describe our approach to expand and maintain the PD program. An enthusiastic and dedicated team is the main factor for the growth of our PD program. The second most

important element is the intensive modality education for patients with chronic kidney disease (CKD) and ESRD. The institution of a formal education protocol led about 30% of patients with CKD stages IV/V to choose PD as their initial RRT modality. The next factor is the adoption of a radiologically placed PD catheter. The surgical method, in which catheter insertion requires surgeon, anesthesia clearance, and operating room time, leads to delays in catheter insertion and PD start. Since most patients at our institution are seen very late in their CKD process, rapid placement of catheters by the IR/IN avoids initiation of RRT using a tunneled hemodialysis catheter (TDC) and HD. In a study from an Ontario group, catheter placement by IR allowed more outpatient procedures and early PD start compared to surgically placed catheters (3). Next, similarly to HD, we streamlined the initiation of PD with 2 telephone calls. The first call was made to the IR/IN to place the PD catheter instead of TDC, when a patient presented with uremic symptoms, and a second call was made by the PD charge nurse to schedule a home visit, PD training in a week post-catheter placement, followed by initiation of therapy. Patients with difficult

abdomens were referred to surgeons for catheter placement earlier in the CKD process. Aggressive strategies and protocols allowed only 25% patients to transfer to HD during 2 years, similar to the 24.8% rate reported in a recent study of 292 PD patients (4). However, in our cohort, peritonitis, catheter malfunction and volume overload were responsible for 22% of transfers compared to 55% in the study. Lastly, to address the elephant in the room – failure to educate US nephrology trainees – as pointed out by Dr. Golper in his editorial (5), we are well-equipped and committed to train our fellows in this dialysis modality. The same statement can be made for PD nurses. Furthermore, since we now fulfill all the infrastructure requirements (6), setting up an urgent-start PD program is our next goal to completely avoid the use of TDC. In conclusion, PD can easily be performed using a multidisciplinary team approach and used as an initial modality for RRT in patients with minimal pre-dialysis care by nephrologists.

DISCLOSURES

The authors have no financial conflicts of interest to declare.

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