The Resurgence of Home Dialysis Therapies

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A recent resurgence of interest in home dialysis treatment is being driven by several factors, including (1) improved clinical outcomes associated with more frequent hemodialysis possible with home therapy; (2) patient preference for and greater convenience of home treatments; (3) lower treatment cost; (4) reduced staffing requirements; and (5) the availability of equipment specifically designed for self-care/home therapy. An important factor has been the recognition that the outcomes of peritoneal dialysis are similar to those of conventional in-center hemodialysis, and the advantages to the patient of utilizing different modalities during their dialysis "lifetime." Additionally, regional home-dialysis programs that offer the full continuum of home therapies and provide comprehensive patient education and clinical support have been developed as a model for reinvigorating home therapies. A shift away from the current model with all too frequent late referral of patients for in-center treatment to a new model characterized by early intervention and home-based dialysis therapies will improve outcomes, while more effectively handling the growing population of patients requiring maintenance renal replacement therapy.

Index Words: Home hemodialysis; modality selection; peritoneal dialysis; self-care

The number of patients with chronic kidney disease (CKD) who received maintenance dialysis in the United States grew to more than 335,000 in 2004.[1] In that year alone, nearly 95,000 patients began hemodialysis (HD), whereas only about 6,700 patients started peritoneal dialysis (PD). Within the next 3 years, more than 660,000 patients in the US will likely be undergoing treatment for end-stage renal disease (ESRD).[2] This epidemic of ESRD is anticipated in the face of the growing shortage of nephrology professionals available to deliver conventional in-center dialysis. This widening gap between the numbers of ESRD patients and nephrology professionals is one factor pointing to the urgent need for new, efficient, and effective treatment models. A paradigm shift away from the current model of routine referral of patients for in-center treatment to a new model characterized by early intervention and home-based dialysis therapies is warranted.

In the past, a large percentage of patients who required dialysis received treatments at home; in 1973, as many as 40% of dialysis patients in the United States received home HD. The proportion of patients receiving home treatments, however, declined dramatically over the following 3 decades as in-center treatment became the standard of care. By 2004, only about one half of 1% of the Medicare ESRD population received home HD.[1]

The prevalence of the other home-based therapy, PD, similarly declined from a peak of 14.9% of the Medicare ESRD population in the United States in 1993 to 5.5% in 2004, despite data that indicate that 5-year survival rates after treatment initiation are very similar for PD and HD.[1] In younger patients, PD is associated with lower adjusted mortality than in-center HD, independent of diabetic status.[3,4]

Traditional hemodialysis centers are generally unable to provide their patients with the full range of therapeutic options—including home HD and PD—for treatment at earlier stages of kidney disease. Even if available, these home-based therapies are often only offered as poorly supported services secondary to the main activity of in-center hemodialysis. Consequently, home-dialysis programs administered by HD centers often lack sufficient numbers of patients to be efficient and lack enough experienced staff dedicated to the home therapy program. With increasingly more research pointing to the compelling clinical outcomes of home-based therapies, such suboptimal approaches need to be replaced with focused, full-time home-therapy support, integrated with early intervention and effective home-therapy programs.

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Unfortunately, patients are very often not adequately presented with home-dialysis options before the onset of dialysis. In the 1997 United States Renal Data System Dialysis Morbidity and Mortality Study (Wave 2), only one quarter of in-center HD patients indicated that PD or home HD had been presented to them when initial treatment-modality options were discussed.[5] Our experience demonstrates that when provided comprehensive education about dialysis treatment options, nearly half of patients select a home therapy, with the prospect of fewer fluid and dietary restrictions, more flexible schedules, greater convenience, improved quality of life, and improved health outcomes.[6]

Selecting Home Therapy—The WellBound Experience

WellBound was established in 2002, with the aim of improving clinical outcomes and enhancing patients' quality of life by providing and supporting the full spectrum of self-care home-dialysis therapies. Analyses of critical indicators of patient wellness demonstrate that clinical outcomes associated with self-care that utilizes this model outperform many clinical benchmarks for conventional treatment, including dialysis adequacy, anemia status, nutritional status, hospitalization, and mortality. The model included the expectation that many more patients would choose a home therapy if educated on the possibility and assured of ongoing support. This expectation was certainly fulfilled.[6,7]

Of 986 patients who attended education classes at a WellBound training center between August 2004 and 2006; nearly half (452; 45.8%) chose a home-dialysis modality.[6] Of these patients, 79.2% (358) chose PD and 20.8% (94) chose home HD. As of August 31, 2006, a total of 388 patients were receiving home dialysis within the WellBound system; 83.5% of patients received PD treatment (38% CAPD; 62% CCPD); 16.5% of patients received home HD (60 patients with the NxStage System One, 3 patients with the Fresenius 2008K@HOME machine, and 1 patient with the Aksys PHD System). Utilization of CAPD ranged from 13% to 53.5% in the 9 training centers; CCPD ranged from 46.5% to 87%. The differences in PD-modality utilization appear dependent on center care-team preference.

Of the 64 home HD patients, 80% (51) performed short-daily dialysis (6 patients every other day, 1 patient 4 days/wk, 6 patients 5 days/wk, and 38 patients 6 days/wk). Twenty percent (13) of the home HD patients performed nocturnal dialysis (2 patients every other night, 1 patient 4 nights/wk, 1 patient 5 nights/wk, and 9 patients 6 nights/wk).

Between 2004 and 2006, a total of 98 patients began home HD. The vast majority of these patients (n = 80; 82%) switched from in-center HD to home HD. Only 8 patients (8.2%) were incident patients who chose home HD as their first ESRD modality, 8 patients (8.2%) switched from PD to home HD, and 2 patients (2%) started after failed transplant.

Improving Outcomes Through Home Dialysis

The HEMO study failed to show a mortality reduction for patients who received an increased dialysis dose in the context of conventional, thrice-weekly, in-center hemodialysis.[8] A logical next step was to consider whether increased dialysis frequency—such as that commonly delivered through home treatment—could improve clinical outcomes. Frequent home HD has been strongly associated with improvements in fluid control, hypertension, and left ventricular hypertrophy in many studies (see recent review by Suri and coworkers[9]). Likewise, improvements in anemia and a reduction in erythropoietin dose have been reported in many studies that evaluated frequent HD.[9] Indicators of nutritional status—including serum albumin, serum prealbumin, nPCR, and dry weight/lean body mass—similarly improved in many reports on frequent home dialysis.[10]

The WellBound experience with short-daily HD shows a major improvement in BP control, with fewer agents and fewer total pills required (Table 1). In contrast, no decrease in the erythropoietin dose to maintain adequate hemoglobin levels was observed (Table 2), and no change occurred in the number of phosphate binders required (Table 3). However, these patients are now eating a liberal diet, with no protein or phosphate restric-