Dialysis Dose: Higher Is Better

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I believe that the work by Pierratos and colleagues titled, "Nocturnal Hemodialysis," which appears in this issue of the Journal, will one day be regarded as another milestone in the treatment of end-stage renal disease (ESRD). Their article describes how centralized monitoring from a remote site has enabled patients to dialyze in their homes at night and sleep during these treatments, because their safety is assured. The Toronto experience includes 12 patients who were treated in this manner for up to 34 months.

I predict that during the next decade, nocturnal hemodialysis will gradually gain acceptance in the ESRD community, because its results will prove to be far superior in terms of patient well being than is possible with short, in-center hemodialysis. It is likely that knowledge of this improvement in health and well being will spread among dialysis patients themselves, especially over the Internet.

How do I know that the results will be that good? I know because nocturnal dialysis reproduces in the home the long, slow, overnight dialysis technique used so successfully by the group in Tassin over the past 30 years (1). The results from Tassin show that by using long, slow hemodialysis, it is possible to normalize blood pressure without drugs, thus greatly reducing morbidity and mortality from cardiovascular complications (2).

Over the years, the center in Tassin also has provided a much larger, weekly dose of dialysis than anyone else. As with the Toronto program, they have delivered this dose more slowly, which further increases the weekly clearance of middle molecules and phosphate (3). This larger, more physiologic weekly dose of dialysis translates into restoration of lean body mass, normal vigor, and the use of a lower dose of phosphate binders. A much higher dose of dialysis also means that the anemia can be better controlled despite the use of a lower dose of recombinant erythropoietin, provided that iron stores are optimized and maintained (4). Because they are normotensive and well dialyzed, patients in Tassin have the longest survival with the lowest incidence of morbidity so far reported in the dialysis literature (1).

These preliminary results from Toronto have proven even better than those from Tassin in terms of weekly dose of dialysis. Dr. Pierratos recently reported to me that they now have 20 patients in their program and have achieved drug-free normalization of blood pressure in most patients using the dry weight method developed in Tassin (5).

The nocturnal dialysis regimen has two important advantages over the Tassin method of overnight, in-center dialysis. First and foremost, thanks to a newly created central monitoring system developed by the Toronto group, the patients can sleep safely in their own beds at home instead of in the dialysis center. As this central monitoring technology continues to be improved, patient acceptance will increase. The success in Toronto with centralized monitoring of a large group of home dialysis patients creates endless possibilities for improving the safety and the appeal of home dialysis to patients and physicians alike.

Second, the 48 to 60 hours per week of dialysis provides so much more time for removal of extracellular fluid volume that it is no longer necessary to restrict sodium in the diet to achieve drug-free normalization of blood pressure using the dry weight method (5). In terms of overall cost of treatment of ESRD, nocturnal dialysis should prove much less expensive than current in-center care, according to the authors.

Major obstacles stand in the way of dialysis centers in the United States that wish to initiate nocturnal dialysis programs. First there is a lack of funding. The Toronto group relied on generous financial support from the Province of Ontario Ministry of Health. At present, similar sources of funding are absent in the United States. There is no funding of research to support innovative new approaches to dialysis treatment. Perhaps the upcoming special conference, "Strategies for Influencing Outcome in ESRD and Pre-ESRD," will find a way to correct this disgraceful lack of funding that has crippled innovative research in dialysis technology in the United States during the last quarter of the 20th century. During the 1960s and 1970s, financial support from the John A. Hartford Foundation and National Institutes of Health contract program led to accomplishments such as the first outpatient dialysis center (6), machine manufacture of dialysis fluid (7), and the first fully automated home hemodialysis machine (8). Restoration of funding for innovative research to improve treatment of ESRD is long overdue.

Second, the ever present problem of circulatory access remains the Achilles heel of chronic hemodialysis. The use of the superior vena cava, which has worked so well long-term with the tiny catheter we developed for home parenteral nutrition (9,10), seems to be working well up until now in Toronto. However, there are inherent risks in central venous catheters, including infection, thrombosis, and outflow problems. Only time will tell whether the subclavian route, as it is being used in Toronto, will prove as durable as the A-V fistula.

Third, there is understandable unwillingness of nephrolo-
gists to recommend hemodialysis in the home. Even in Seattle, where the technique of home hemodialysis was developed, it has gradually dropped to a very low percentage of patients. I attribute this primarily to fear or lack of time and interest on the part of busy nephrologists and a decline in the quality of the all-important patient training program due to under-utilization. The Toronto experience suggests, however, that the new monitoring technology may provide the practicing nephrologist with new support mechanisms.

If the momentum to return to home hemodialysis is to gain renewed strength in this country, dialysis patients themselves also must take an active role. It is hoped that as they become aware of the spectacular results being achieved in Toronto with nocturnal hemodialysis, dialysis patients who are interested in home care, along with innovative dialysis nurses, technicians, and physicians, will make the effort to start a second movement to home-based treatment. However, to make this happen anytime soon, new sources of research funding will have to be made available.

References