The Good Catheter

Peritoneal catheter use should be considered first for dialysis access.

BY JACK WORK, MD

"To PD or not to PD, that is the question:
Whether 'tis nobler in the mind to suffer
The first 90 days with an HD catheter,
Or to take arms against a sea of convention
And by opposing them choose PD … "

John Burkart, MD, posited this question ("To PD or not to PD, that is the question") in an editorial in *Seminars in Dialysis*.[1] He noted that, unfortunately, in the United States, with < 10% of prevalent patients on peritoneal dialysis (PD), the answer has been "not to PD." Dr. Burkart went on to point out that a randomized trial comparing similar patients on either PD or hemodialysis (HD) would best address the question of whether or not the low prevalence of PD in the United States is justified based on medical outcomes.

EVALUATING OUTCOMES

Most observational studies support PD as having an initial survival advantage over HD.[2-4] In a Netherlands observational study, all patients with end-stage renal disease were included starting from the first day of treatment, unlike United States Renal Data System data, which starts on day 91. This study found that although the survival advantage of PD changes over time, similar to United States Renal Data System data, the survival advantage of PD over HD persists for 1.5 years.[4]

Several factors may contribute to the initial survival advantage of PD over HD. One factor in the early higher mortality on HD is the frequent initial use of central venous catheters for HD access. A study that examined mortality during the first 90 days of dialysis replacement therapy found that 21.9% of the patients with a HD catheter died versus 6.4% of patients with a PD catheter.[5] Another factor is the better preservation of residual kidney function with PD. Residual kidney function has been strongly correlated with survival in dialysis patients.[6,7]

"Patients who receive a renal transplant while on PD have better short- and long-term outcomes compared to patients who are on HD . . . "

There are multiple other factors favoring a PD-first approach for patients reaching end-stage renal failure. Patients who receive a renal transplant while on PD have better short- and long-term outcomes compared to patients who are on HD before the transplant.[8,9] PD is associated with better quality of life or patient satisfaction,[10] and patients are more easily able to continue to work while on PD compared to in-center HD. The cost of PD is substantially less compared to in-center HD. The PD catheter—the "good" catheter—cost per person per year is significantly less compared to patients with other access types including working fistulas. In addition, per-person, per-year access-event costs by access type are significantly less for the good catheter.[11]

Although a randomized controlled trial would be optimal in resolving the questions regarding a comparison of PD with HD, it is unlikely such a study will be completed. Korevaar and associates attempted to perform a randomized study comparing PD with HD. The study was discontinued because after receiving fully informed consent, only 38 patients agreed to be randomized. Importantly, of the 735 patients eligible for the study, 95% did not want to be randomized but

wanted to make an informed choice of modality. Fifty-two percent chose HD, and 48% chose PD.[12] In a prospective evaluation of renal replacement modality eligibility, Mendelssohn and colleagues found that 78% of a cohort of more than 1,300 chronic kidney disease patients was eligible for PD based on both medical and psychosocial contraindications.[13]

PD CATHETER PATENCY

Unfortunately, in the United States, even with the success of the Fistula First Breakthrough Initiative, 82% of patients still initiate HD using a central venous catheter—the "bad" catheter.[11] Long-term dialysis access patency is a factor frequently considered when evaluating a dialysis modality. During the Fistula First era in the United States, the focus has been on comparing the fistula with either the graft or the central venous catheter in terms of access survival while neglecting both PD and the good catheter.

A recent study by Singh and coworkers examined PD catheter patency. These authors found that PD catheter survival rates at 12, 24, and 36 months were 92.9%, 91.9%, and 91.1%, respectively, in 315 patients during the study period of January 2001 to September 2009. PD catheter–related noninfectious problems were the only variable that was significantly associated with catheter survival.[14] Vascular access survival rates, with the best results being < 60% at 24 months, do not approach the excellent results of PD catheter survival reported by Singh. The PD catheter rarely has a primary failure rate (failure to mature), unlike the fistula with a 60% failure rate reported recently by Dember and colleagues.[15]

COST

The recent implementation of bundled payments provides one basic payment rate under the end-stage renal disease prospective payment system for both peritoneal and HD.[16] This change may incentivize dialysis providers to offer PD among eligible patients. In-center dialysis has a greater overhead cost compared to home dialysis. Historically, the in-center profit margin has been derived from the ancillaries such as injectable medications. With the change in facility reimbursement to a fixed payment (the bundle), facilities can improve their profit margin through lower fixed and variable costs. Therefore, the new payment environment established by the bundle along with the educational requirement in the conditions of coverage may stimulate growth of home therapies, given the inherent lower building infrastructure, staffing costs, capital equipment costs, and, frequently, medication costs of home dialysis.[16]

CONCLUSION

Although Fistula First has been very successful in achieving an increased prevalence of fistulas in the United States, this restricted focus has led to the perception that one modality fits all patients. Patient outcomes support the conclusion that peritoneal dialysis should be viewed as complementary to hemodialysis and not competitive. Developing an "end-stage renal disease life plan" for each patient that optimizes the individual patient's long-term outcome should be the goal.[1] Perhaps a PD-first approach would have the same success as the Fistula First program if all patients were given a fully informed choice, as is now required under the Conditions of Coverage, and level the playing field created by the bundle. Time will tell. ■

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1. Burkart J. Why is the evidence favoring HD over peritoneal dialysis misleading? Sem Dial. 2007;20:200-202.
2. Fenton SS, Schaubel DE, Desmeules M, et al. HD versus peritoneal dialysis: a comparison of adjusted mortality rates. Am J Kidney Dis. 1997;30:334-342.
3. Collins AJ, Wenli Hao MS, Ebben JP, et al. Mortality risks of peritoneal dialysis and HD. Am J Kidney Dis. 1999;34:1065-1074.
4. Heaf JG, Lokkegaard H, Madsen M. Initial survival of advantage of peritoneal dialysis relative to HD. Nephrol Dial Transplant. 2002;17:112-117.
5. Metcalfe W, Khan IH, Prescott GJ, et al. Can we improve early mortality in patients receiving renal replacement therapy? Kidney Int. 2000;57:2539-2545.
6. Shemin D, Bostom AG, Laliberty P, Dworkin LD. Residual renal function and mortality risk in HD patients. Am J Kidney Dis. 2001;38:85-90.
7. Moist LM, Port FK, Orzol SM, et al. Predictors of loss of residual renal function among new dialysis patients. J Am Soc Nephrol. 2000;11:556-564.
8. Bleyer AJ, Burkart JM, Russell GB, Adams PL. Dialysis modality and delayed graft function after cadaveric renal transplantation. J Am Soc Nephrol. 1999;10:154-159.
9. Goldfarb-Rumyanitzev AS, Hundle JF, Scandling JD, et al. The role of pretransplantation renal replacement therapy modality in kidney allograft and recipient survival. Am J Kidney Dis. 2005;46:537-549.
10. Rubin HR, Fink NE, Plantinga LC, et al. Patient ratings of dialysis care with peritoneal dialysis versus HD. JAMA. 2004;291:697-703.
11. United States Renal Data System. USRDS 2009 Annual Data Report: Atlas of Chronic Kidney Disease and End-Stage Renal Disease in the United States. Bethesda, MD: National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases; 2009.
12. Korevaar J, Feith GW, Dekker FW, et al. Effect of starting with HD compared with peritoneal dialysis inpatients new on dialysis treatment: a randomized controlled trial. Kid Int. 2003;64:2222-2228.
13. Mendelssohn DC, Mullaney SR, Jung B, et al. What do American nephrologists think about dialysis modality selection? American J Kidney Dis. 2001;37:22-29.
14. Singh N, Davidson I, Minhajuddin A, et al. Risk factors associated with peritoneal dialysis catheter survival: a 9-year single-center study in 315 patients. J Vasc Access. 2010;11:316-322.
15. Dember LM, Beck GJ, Allon M, et al. Effect of clopidogrel on early failure of arteriovenous fistulas for HD: a randomized controlled Trial. JAMA. 2008;299:2164-2171.
16. US Department of Health and Human Services. Conditions of Coverage, ESRD Conditions Final Rule. 42 CFR parts 410, 413 and 414. Page 448. April 15, 2008.