Systematic differences among patients initiated on home haemodialysis and peritoneal dialysis: the fallacy of potential competition

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Abstract

Background. The adoption of home-based dialysis therapies is growing internationally. There is a possibility that competition for patients may exist between peritoneal dialysis (PD) and home haemodialysis (HHD) for their respective growth.

Methods. Clinical demographics of patients initiating PD and HHD from 2004 to 2008 in our centre were abstracted using institutional electronic records. We compared clinical demographics, laboratory data and process of care to describe potential factors leading to patients choosing home-based dialysis therapies.

Results. Between 2004 and 2008, 236 patients initiated home dialysis therapy in our centre: 153 patients to PD and 83 patients to HHD. PD and HHD patients differed in age (PD 62 ± 16 vs HHD 46 ± 13 years; P < 0.001) and gender distribution (PD 57% vs HHD 70% male; P = 0.05). A higher proportion of PD patients had diabetes and hypertension as the primary cause of their end-stage renal disease (ESRD). In contrast, there were more patients with glomerulonephritis among the HHD cohort. Cardiovascular and peripheral vascular diseases were more common among patients on PD. HHD patients had longer ESRD vintage (PD 0.34 ± 0.69 and HHD 4.8 ± 6.8 years on therapy; P = 0.002). The proportion of patients receiving chronic kidney disease care was higher among PD starters (PD 86% vs HHD 65%; P < 0.001). Sixteen percent of PD patients and 9% of HHD patients initiated their home-based renal replacement therapy after an acute hospitalization without prior modality education.

Conclusion. There is a systematic difference between patients initiated on PD and HHD. Our data reaffirm that modality selection is a complex process. Patients on the two home therapies differ demographically and arrive through different routes. This finding suggests that the two home-based modalities are not in competition.

Keywords: home dialysis; home haemodialysis; patient choice; peritoneal dialysis; predialysis care

Introduction

The adoption of home-based dialysis therapies [peritoneal dialysis (PD) and home haemodialysis (HHD)] is growing internationally. Observational studies have demonstrated that home dialysis may offer clinical benefits while enhancing quality of life [1–3]. Indeed, most nephrologists proposed that 80% of patients with end-stage renal disease (ESRD) are potential candidates for home dialysis [4]. However, the prevalence of home dialysis remains inappropriately low in the United States and Europe with 7.5–15% of patients on PD and 0.6–2% on HHD [5,6]. Some authorities have questioned the possibility of competition between PD and HHD for patients. Recent evidence has suggested that the implementation of an HHD programme did not adversely impact on the growth of an established PD programme [7]. In order to empower further adoption of home dialysis, a clear understanding of the origins of home dialysis patients is essential.

The aim of the present study was to describe patients starting home dialysis (PD and HHD) at the Toronto General Hospital, University Health Network to determine if there are systematic differences among patients who were initiated on these therapies.

Materials and methods

Design and definitions

This is an observational cohort study with prospectively collected data. Institutional research ethics board approval was obtained. All information obtained was cross-referenced and validated with electronic and paper charts as well as with direct patient interview when necessary.

We describe all patients initiating home dialysis therapies (PD and HHD) at the Toronto General Hospital, University Health Network from 1 January 2004 to 31 December 2008. Patient demographics information such as age, sex, ethnicity, aetiology of ESRD and comorbid conditions were prospectively collected into a computerized clinical database. Other variables were included to assess process of care. These parameters included the duration and attendance at chronic kidney disease clinics, identifiable pre-specified renal replacement modality preference, prior renal replacement therapy (RRT), dialysis access at time of first dialysis and ESRD vintage prior to the initiation of PD or HHD.
Education programme

Our centre has a ‘home dialysis first’ policy. Every effort is made to preferentially offer patients home dialysis modalities. All patients from our chronic kidney disease clinic are educated about home dialysis. The education programme consists of (i) documentation on the different dialysis modalities, (ii) a visit to the home dialysis (PD and HHD) units, (iii) information sessions with nurses and physicians and (iv) meeting with other patients performing home dialysis. The majority of patients are offered both HHD and PD unless they have contraindications to a specific modality. The same education programme is provided to in-centre haemodialysis patients, transplant patients or patients with acute need for RRT, upon request. With our recruitment strategies, our prevalent home dialysis population constitutes 24 (PD) and 14% (HHD) of our dialysis population.

Statistical analysis

Continuous variables were expressed as the mean ± standard deviation or median with interquartile ranges. Categorical variables were expressed as percentage or number. All continuous data were compared using a Mann–Whitney test, while dichotomous data were compared by Pearson’s chi-square test. All P-values were two-tailed, and values <0.05 were considered significant. All analyses were performed using SPSS-16 (SPSS, Chicago, IL).

Results

During the study period, 236 patients initiated home dialysis therapies (PD or HHD) at the Toronto General Hospital. Among these patients, 153 were started on PD (55 in continuous ambulatory peritoneal dialysis and 98 in automated peritoneal dialysis) and 83 on HHD. Baseline characteristics of PD and HHD patients are summarized in Table 1. There were differences in age, sex and aetiology of ESRD among PD and HHD patients. Specifically, HHD patients were younger and predominantly male. A higher proportion of PD patients had diabetes and hypertension as the primary cause of ESRD. In contrast, there were more patients with glomerulonephritis among the HHD cohort. Cardiovascular and peripheral vascular diseases were more common among patients on PD.

The proportion of patients receiving chronic kidney disease care was higher among PD starters (PD 86 vs HHD 65%; P < 0.001). Interestingly, only a minority of patients were able to identify their intended renal replacement modality. A higher proportion of PD patients had diabetes and hypertension as the primary cause of ESRD. In contrast, there were more patients with glomerulonephritis among the HHD cohort. Cardiovascular and peripheral vascular diseases were more common among patients on PD.

The ESRD vintage prior to the initiation of home dialysis was longer among HHD patients (PD 0.34 ± 0.69 vs HHD 4.8 ± 6.8 years on therapy; P = 0.002). As a result, HHD patients were more likely to have undergone another renal replacement modality prior to the present modality (PD 18 vs HHD 69%; P < 0.001). The distribution of their previous renal replacement modalities is listed in Table 2. It is interesting to note that 37% of HHD patients came from the in-centre HD programme.
Discussion

The present study demonstrates that there is a systematic difference among patients initiated on PD and HHD. We identified that (i) there is a consistent difference among patients started on PD and HHD with reference to their age, sex, cause of ESRD and comorbid illness profile, (ii) HHD patients have a longer ESRD vintage and (iii) home dialysis initiation is possible despite the lack of prior modality education. Our study highlighted several important knowledge gaps in the practice and delivery of home dialysis. Additional efforts and innovations in education, home support and dialysis technology will be essential to further empower patient adoption of home-based dialysis delivery.

Variations in perceptions from patients and healthcare providers may account in part for our findings. Our data suggest that there is a bias in age and gender towards adoption of PD. It is reasonable to assume that home-based RRT is overwhelming to patients with ESRD and especially for those who have a higher comorbid disease burden. Cukor et al. have recently outlined the complex interactions between the psychosocial aspects of chronic illness and the medical decisions of ESRD patients [8]. There is no question that any home-based therapy may pose an intrusion to patients. Our group has shown that PD and HHD have similar illness-intrusive impact score as perceived by our patient population [9]. It is tempting to hypothesize that there is an innate bias to initiate younger patients on HHD because of the complexity of haemodialysis technology whereas there is an equal bias for PD to be viewed as a ‘gentler’ form of RRT, making it more suitable for patients with more comorbid illness. Our present observation reaffirms that the psychosocial impact of RRT is as important as the clinical aspect of dialysis delivery in reference to modality selection. Further work is needed to delineate the optimal balance between patient perception and clinical education to facilitate dialysis modality selection.

There is well-described body of evidence to support the use of multidisciplinary chronic kidney disease care and its effect on home dialysis adoption [10,11]. Mclaughlin et al. have demonstrated the use of multifaceted education intervention in patients with a glomerular filtration rate (GFR) < 30 mL/min [12]. Seventy patients participated in this randomized controlled trial. Patients who received the educational intervention were more likely to accept all forms of self-care dialysis. Our present observation is consistent with this growing body of literature. In fact, the majority of all PD starters were graduates from our chronic kidney disease clinic. However, it is important to emphasize that modality education should not be confined to patients undergoing conventional haemodialysis and for patients who needed to start RRT acutely without prior modality education. Thirty-seven percent of patients entering the HHD programme were previously on in-centre HD. This high number of patients switching from in-centre modalities to home dialysis may be in part explained by our education strategy. There is also a relative paucity of published literature in the use of other educational tools (such as high fidelity simulation) and implementation of various teaching methods on dialysis modality preparation, which merits further investigations.
Despite our educational efforts to recruit patients to home dialysis from our chronic kidney disease clinic, the majority of them (69% in PD patients and 72% in HHD patients) did not have an intended treatment modality after they received education on RRT. This finding highlights the difficulty for most patients to commit to a dialysis modality choice. It is reasonable to postulate that some patients will only choose a modality when they are confronted with the fact that they need to start dialysis imminently. This may explain in part the dissociation between education and intended modality choices. Further work is required to identify strategies to help our patients to commit to a planned dialysis start.

If there is a wider acceptance of home dialysis, innovations in dialysis delivery is essential. Recent evidence supports the use of assisted home PD in patients who may otherwise not be eligible for home-based RRT. Oliver et al. documented the clinical course of 22 assisted PD patients [13]. These authors stated that adverse event rate was similar between assisted PD and traditional PD. They further concluded that barriers to self-care are common and that chronic home assistance may allow for a feasible long-term solution for these vulnerable patients. Our present study showed that the ESRD vintage of HHD patients was higher than that of PD patients. It is tempting to speculate that experienced patients are more likely to accept the technical complexity associated with HHD. Innovations in home care delivery and advances in dialysis technology will be critical rate-limiting steps in facilitating wider adoption of home-based dialysis [14–17].

Our study is limited by its observational nature. We were unable to identify if there were absolute contraindications to home dialysis that were otherwise unknown. We also did not study the perceptions and availability of caregivers. Furthermore, this study was performed in a centre with a ‘home dialysis first’ policy. Our home dialysis prevalence PD (24%) and HHD (14%) is relatively higher compared to the current Canadian statistics [18]. Indeed, according to the latest Canadian Organ Replacement Registry, 47% of the ESRD population is on in-centre haemodialysis, 11% on PD, 1.8% on HHD and the remaining have a functioning kidney transplant. Similarly, the recent European data demonstrated that <1% of ESRD patients are on HHD and 10–20% are on PD [6]. To date, no study has systematically compared the characteristics of PD and HHD patients in a ‘home dialysis first’ environment. Our results will help to understand the origin of patients choosing a specific home dialysis modality and reinforces the complementary nature of these dialytic modalities.

Conclusion

In summary, the present study was able to demonstrate systematic differences among patients who initiated PD and HHD. Patients on the two home therapies differ demographically and arrive through different routes. This finding suggests that the two home-based modalities are not in competition. Further prospective initiatives are needed to enhance patients’ willingness and acceptance of home dialysis.

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Conflict of interest statement. None declared.

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