Peritoneal Dialysis International, Vol. 35, pp. 663–666
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ASSISTED PERITONEAL DIALYSIS FOR OLDER PEOPLE WITH END-STAGE RENAL DISEASE: THE FRENCH AND DANISH EXPERIENCE

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Older people are the largest and fastest growing group of patients with end-stage renal disease (ESRD), and, due to advanced age and a heavy burden of comorbidities, they are usually not candidates for renal transplantation or home-based dialysis treatment. Some of the barriers for home treatment are non-modifiable, but the majority of physical disabilities and psychosocial problems can be overcome provided that assistance is offered to the patients at home.

In the present review, we describe the programs for assisted peritoneal dialysis (PD) in France and Denmark, respectively. In both nations, assisted PD is totally publicly funded, and the cost of assisted PD is comparable to the cost of in-center HD. Assisted continuous ambulatory PD (aCAPD) is the preferred modality in France whereas assisted automated PD (aAPD) is the preferred modality in Denmark. Assistants are professional nurses or healthcare technicians briefly educated by expert PD nurses from the dialysis unit.

The establishment of a program for assisted PD may increase the number of patients actually treated with PD and may reduce the risk of PD technique failure and prolong PD duration. Compared with autonomous PD patients, patients on assisted PD may have shorter patient survival and peritonitis-free survival indicating that, besides advanced age and the burden of comorbidities, dependency on help may be an independent risk factor for poorer outcome.

Assisted PD is an evolving dialysis modality, and may in the future prove to be a feasible complementary alternative to in-center hemodialysis (HD) for the growing group of dependent older patients with ESRD.

***Perit Dial Int* 2015; 35(6):663–666**
http://dx.doi.org/10.3747/pdi.2014.00344

KEY WORDS: Peritoneal dialysis; elderly; assistance.

Older people are the largest and the fastest growing group of patients with end-stage renal disease (ESRD) (1–3). Due to advanced age and often a heavy burden of comorbidities, they are usually not candidates for kidney transplantation, and they are less likely to be offered home-based peritoneal dialysis (PD) treatment, as older age is associated with significantly more contraindications for PD (4). Some of these contraindications are non-modifiable conditions (e.g., multiple previous abdominal surgery with adhesion formation, large hernias, diverticulosis, or severe obesity), but the majority of physical disabilities (e.g., hemiparesis, impaired vision or hearing, decreased manual dexterity and strength) or psychosocial problems (e.g., cognitive problems, depression, noncompliance, social isolation, and dependency on help) are barriers that can be overcome provided that proper support and assistance are offered to the patients at home.

Compared to in-center hemodialysis (HD), PD at home may offer several advantages that may be particularly important for patients of advanced age with severe comorbidity (2,3). Most important are the avoidance of transportation to and from the dialysis unit, of vascular access for HD and the associated risk of bacteremia and access failure, of hemodynamic instability during HD sessions, and of post-treatment fatigue.

In France and in Denmark, assisted PD is fully covered by healthcare insurance or the public healthcare system (5–7). The establishment of a program for assisted PD may significantly increase the number of patients actually treated with PD (8) and may reduce the risk of PD technique failure among older patients, thereby prolonging PD duration (9–10). Indeed, in France, assisted PD is the preferred dialysis modality for older patients entering dialysis when patients are informed of treatment options (11,12). Assisted PD is an evolving dialysis modality in many parts of the world (13).

Assisted PD is defined as PD treatment performed at the patient's home or in a nursing home and based on assistance from a healthcare technician, a community nurse, a family member, or a partner (14). Except for family assistance, assisted PD requires specific funding, which varies from one country to another (15). The operational cost of assisted PD is not significantly different than the cost of in-center HD in Denmark (6). In France, a recent study from the Haute Autorité de Santé demonstrated that the global cost of in-center HD is higher than the cost of assisted PD. These findings do not consider capital costs devoted to build HD units and only deal with costs of nurses, materials, and patients' training and follow-up.

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Received 29 December 2014; accepted 24 February 2015.

THE FRENCH EXPERIENCE WITH ASSISTED PD

Assisted PD has been used for years in France (16), where it is performed in public hospitals, non-profit dialysis centers, or private hospitals (5). Home-based dialysis is the responsibility of non-profit dialysis centers. Consequently, nephrologists from public hospital services must transfer their PD patients to these non-profit dialysis centers, but in most cases, patients' education, regular follow-up, and hospitalization are provided by the public centers. Nephrologists from public hospitals frequently work part-time in non-profit dialysis centers.

In the French Health Care organization, nurses can practice in the public system or in the private sector, and they are paid for each PD-related procedure including exit-site care and patient monitoring. No special nurse's legal qualification in PD is required. Assisted PD is largely used in the older population (7,17). In 2006, 21.5% of the incident PD patients were over 80 years of age.

In France, each dialysis center has a legal obligation to offer a choice between all dialysis modalities. The ability to perform PD is assessed by the physician and the PD nurses. When patients are not able to manage their own treatment, the spouse or partner is asked to participate. Especially for the older population, the burden of home therapy on the quality of life of the family member is carefully evaluated by PD nurses. If this burden is estimated to be too high, assisted PD is offered instead. Assistance may be used for only a limited period of time, if the patient needs to gain self-confidence with the treatment or needs more time spent on education. However, even for an individual on assisted PD who wants to become autonomous, patient training remains the responsibility of PD nurses from the dialysis center. Assistance may also be used on a long-term basis to maintain the patient on PD.

As public nurses work only in hospitals, patients must choose a private nurse in their area to be in charge of their dialysis treatment. These nurses are trained for PD, exit-site care, and patient monitoring in the public hospital. In an attempt to increase the use of PD, French Health Care regulation now allows nurses from the private sector to perform PD in nursing homes. When the patient and the private nurses are ready to start assisted PD at home or in the nursing home, supplies for PD are delivered by the non-profit clinic. In most of the centers, a PD nurse accompanies the private nurse to the patient's home for the first PD session. In order to evaluate patients' capacity to cope with PD at home, patients are seen at the PD clinic by PD nurses and a physician after 1 or 2 weeks on home PD. Subsequently, patients are followed on a regular basis every 6 to 8 weeks. In France, nephrologists are legally obligated to see PD patients at the clinics and to review PD prescription every 2 months. Nurses are not authorized to modify the PD modality without a written medical prescription.

Private nurses in charge of PD patients can get counseling support, make an appointment at the dialysis clinic, or send the patient to the nephrologist on duty whenever necessary. Assisted PD patients are usually admitted directly to public units if hospitalization is requested. Home visits by PD nurses are funded by the PD centers in approximately half of the public hospitals. The aims of those visits are to check the patients and the private nurses' skills and to assess patients coping with home therapy (18). Until recently, assisted continuous ambulatory PD (aCAPD) was the dialysis modality by default for older patients on assisted PD, but the rate of assisted automated PD (aAPD) is currently increasing, and the emerging trend is to provide a free choice between aAPD and aCAPD for older patients. Assisted APD patients are encouraged to learn the disconnection procedure in order to save time in the morning. Patients are also instructed to turn off the cycler in case of emergency or if there are too many alarms during the night. In case of peritonitis, the treatment is initiated in the dialysis clinic and private nurses are subsequently asked to infuse antibiotics in the dialysis bags at the patient's home.

In our last report, 1,232 out of 1,613 (76%) French PD patients over 75 years of age were on assisted PD. Among these, the median patient survival, technique survival, and peritonitis-free survival were 27.1, 21.4, and 32.1 months respectively (7). In 1 recent study from our group, assisted PD patients did not have a higher risk of peritoneal infection compared with self-care PD patients (18)

THE DANISH EXPERIENCE WITH ASSISTED PD

In Denmark, we established a program for aAPD 15 years ago (19–21). The majority of patients included in our aAPD program so far are older incident patients with ESRD who prefer and are suitable for home-based PD but are unable to perform the treatment themselves due to comorbidities, physical disabilities, or psychosocial problems described previously (20). A smaller group of patients included are prevalent, previously autonomous PD patients who have lost their independence due to advancing age or increasing numbers of comorbidities or complications (e.g. stroke). Yet another smaller group of patients are older prevalent HD patients switched from in-center HD to aAPD due to their own preference for a home-based therapy or due to failure of vascular access for HD, discomfort or complications with HD, or post-HD asthenia. For most patients included in the program, the commitment will be permanent, but, for some patients, the need for assistance can gradually be reduced as the patient gains more knowledge, experience, and confidence with the therapy.

In Denmark, we use professional public paid community nurses or nursing home staff as assistants. Once the patient has accepted aAPD as future dialysis modality, we train a small team of assistants for every patient. It is our experience that professional nurses need only remarkably short training. In our unit, the assistants receive 2.5 hours theoretical training in the local center followed by 2.5 hours of practical training in the patient's home or at the nursing home, when the patient is discharged from the hospital. They are trained not only to set up the cycler and to connect and disconnect the patient, but also to take care of the exit site, dressings, and fixation of the PD catheter, and to carefully observe the patient for infectious or mechanical complications, optimal fluid balance, and

nutritional status. Finally, they are trained to order PD fluids and other relevant equipment to carry out the treatment. Importantly, our unit offers a 24-hour-a-day, 7-days-a-week telephone backup service for advice and support for aAPD patients, their relatives, and their assistants.

Other than lifestyle reasons, the main reason for choosing aAPD instead of aCAPD is that the assistant only has to visit the patient twice daily: a longer visit in the morning to disconnect the patient from the cycler, set up the cycler for the next night, and take care of the patient, the exit site, possible complications, and the logistics related to the treatment, followed by a short visit in the evening to connect the patient to the cycler (18,20). Many aAPD patients gradually take over parts of the treatment (e.g. connection and disconnection), making them more independent of the assistants and making a single daily visit from the assistants sufficient.

Regarding clinical outcomes, we have previously reported (20) that aAPD patients, compared with older (> 65 years) autonomous PD patients, in our care have the same PD technique survival rate but an inferior patient—and peritonitis-free—survival rate, which corresponds to the experience from France (17,22). This difference persists even after adjustment for differences in basic demographics, age, and comorbidity and indicates that dependency on help *per se*, not surprisingly, is an independent risk factor for a poorer prognosis. Crude 1-year survival rate among our aAPD patients is approximately 75 – 80%. In Denmark, the average number of hospital admission days, often regarded as a surrogate marker for morbidity, is 35 days per year for aAPD patients, 19 days per year for autonomous PD patients, and 22 days for in-center HD patients. In addition, older patients (> 70 years of age), irrespective of dialysis modality, require 10 extra admission days per year, which explains the difference in the number of admission days between aAPD patients and autonomous PD patients (21).

Given the challenges and difficulties in running an assisted PD program, it is evident that success is critically dependent on a well-organized multidisciplinary team of dedicated expert renal nurses, assistants, surgeons, social workers, dieticians, nephrologists, and others. Ideally, all patients with ESRD should have a real choice of dialysis modality, and aiming at the best possible quality of life should be the most important guide for modality selection for every single patient including the older, frail, and physically dependent patient. We believe that assisted PD in the future will prove to be a safe and feasible complementary alternative to in-center HD for the growing group of dependent older patients with ESRD.

KEY POINTS

- Due to advanced age and the burden of comorbidities, the growing group of older patients with ESRD are usually not candidates for self-care home-based PD.
- Some of the barriers for PD are non-modifiable, but the majority may be overcome provided that proper support and assistance are offered to the patients at home.
- In France and Denmark, the operational cost of assisted PD is equal or inferior to the cost of in-center HD.
- Assisted PD may increase the number of older patients actually treated with PD at home, and may reduce the risk of PD technique failure, thereby prolonging the duration of PD.
- Dependency on help, on top of advanced age and a heavy burden of comorbidities, may be an independent risk factor for poorer outcomes.
- Assisted PD is an evolving dialysis modality that may in the future prove to be a feasible complementary alternative to in-center hemodialysis (HD) for the growing group of dependent older patients with ESRD.

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