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# Assisted Peritoneal Dialysis

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## Abstract

The number of patients depending on dialysis therapies increases worldwide. The home-based dialysis modalities offer some advantages especially for elderly patients. In the case of peritoneal dialysis (PD), the life quality is superior compared to in-center hemodialysis (HD), and other advantages are existent. Due to the effect that a lot of elderly PD patients are frail, a concept covering the different modalities of PD must include the assistance at home or the living environment (assisted PD) for the bag exchanges that often cannot be performed reliably by elderly and frail patients by themselves. Nowadays, we have enough data to safely offer assisted peritoneal dialysis (aPD) in a cost-saving manner. Putting all these aspects together, aPD is a safe and in some countries widely used modality. The issue of reimbursement and education of home nurse staff must be solved. However, for elderly and frail patients, aPD offers a change to use the advantages of PD for these population, and on a local level, the provider should seek ways to establish aPD programs.

**Keywords:** dialysis, peritoneal dialysis, assisted, home care, assisted peritoneal dialysis

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## 1. Introduction

The number of patients depending on dialysis therapies increases worldwide. The estimations now are 284 patients per million population (pmp) for 2010 [1, 2]. This increasing numbers are due to the effect of aging and the demographic shift with increasing incidences of diabetes and hypertension, besides a better access to dialysis in the Third World [3]. The home-based dialysis modalities offer some advantages especially for elderly patients. In the case of peritoneal dialysis (PD), the life quality is superior compared to in-center hemodialysis (HD), and other advantages have to be taken into account (**Tables 1** and **2**) [4]. However, a lot of elderly PD patients are frail [5, 6]. Therefore, a concept covering the different modalities of PD must include the assistance at home or the living environment (assisted PD) for the bag exchanges

Advantages	Practice consequence
Home-based treatment	<ul style="list-style-type: none"><li>• Patients stay in their environment</li><li>• Less medication of the disease</li><li>• More independence</li><li>• Fewer hospital visits</li></ul>
No need for vascular access	<ul style="list-style-type: none"><li>• Less surgical procedures required</li><li>• No use of central venous catheter and reduced risk of related infection</li></ul>
Better hemodynamic tolerance	<ul style="list-style-type: none"><li>• Less hypotensive episodes with less associated ischemic complications (myocardial stunning, ischemic brain injury, gut hypoperfusion, and bacterial translocation)</li><li>• No need for post-dialysis recovery time</li></ul>
No need for transportation	<ul style="list-style-type: none"><li>• Less time required for treatment</li></ul>
Better residual renal function preservation	<ul style="list-style-type: none"><li>• Flexibility of dialysis prescription, allowing incremental peritoneal dialysis</li></ul>
Possibility of providing assistance for non-self sufficient patients	<ul style="list-style-type: none"><li>• Increase in peritoneal dialysis eligibility</li><li>• Less burden of disease</li></ul>

**Table 1.** Advantages of peritoneal dialysis in elderly patients [4].

Hemodialysis advantages	Peritoneal dialysis advantages
Others take the burden of therapy	Independence
Social contacts	Roles can be fulfilled
Regular medical consultations	Less need to show up at the dialysis center
Better monitoring	Higher mobility
	No need for access to major vessels

**Table 2.** Comparison of HD versus PD for elderly patients [7].

that often cannot be performed reliably by elderly and frail patients by themselves. The different dialysis modalities have additionally pros and cons. Therefore, some colleagues additionally are asking “Peritoneal or hemodialysis for the frail elderly patient, the choice of 2 evils?” In the cited article, the authors conclude that aPD could be first modality even in elderly and frail patients [7]: “Elderly patients often have complex medical conditions and wide-ranging priorities for their care. With multifaceted assessments of care, physicians should be able to give these individuals the ability to select and continue to make the best decisions for their care.”

2. Assisted peritoneal dialysis (aPD)

The use of peritoneal dialysis (PD) offers advantages for the elderly patient [4]. Elderly dialysis-dependent patients on HD stay almost 50% of the remaining lifetime in hospitals. PD offers more time in the home environment of the patients [8]. One contributing point is that PD

is better tolerated (hemodynamic) and there is no need for a vascular access [9]. Additionally, the need for regularly transports into the center for HD is cost-saving and often means better life quality [10]. A better preservation of residual renal function by PD must not only be mentioned as a major factor to life quality but also reduced mortality at the beginning of PD [11–13]. To make all these advantages accessible for the elderly and frail patient with end-stage renal disease (ESRD), PD has to be part of the decision regarding the modality selection [14]. However, all these logical arguments lead not to a robust use of PD in elderly patients in different countries. With assisted PD (aPD), some obstacles of a self-treatment can be answered; however, the community of nephrologists has some skepticisms. On an international level, we found an extreme heterogeneous picture regarding the use of assisted peritoneal dialysis (aPD) [4]. Therefore, the facts have to be discussed further. In a summary about the evidences regarding elderly patients on dialysis, the authors found 14 studies with more than 100,000 PD and far more HD patients [15]. Regarding mortality, in six studies there were no differences between HD and PD, and in five studies, HD was better and in three PD. Most of the experiences came from France. Other authors summarized the experiences with home-based assistance in case of chronic kidney diseases (CKD) [16]. They were able to collect 14 studies about aPD. In aPD studies with comparators, outcomes such as peritonitis rate and technique and patient survival constituted the main areas of focus. The probability of technique failure following an episode of peritonitis was similar between home-assisted aPD, self-care PD, and family aPD patients. They found that in general studies using information from France the technique failure/transfer to HD was lower among home-care (nurse) aPD patients when in self-care PD patients only. Together, aPD is a modality that can be offered evidence-based in a safe manner.

The French experiences, which further were summarized in a report from the French peritoneal dialysis registry (RDPLF), were very positive and gave a lot of support for discussions in other countries [17]. They observed 1613 patients older than 75 years who started PD between January 2000 and December 2005. The conclusion was that “PD is a suitable method for elderly patients. In order to increase the rate of PD utilization in elderly patients, the need for the funding of aPD has to be taken into account.”

What we learn from the French data and have to keep in mind is the topic of reimbursement of the assistance. This is an issue in a lot of countries. Without reimbursement, the home care could not be delivered. In countries such as France, a correct reimbursement is established, and the aPD is used in wide areas.

From an economic point of view, we additionally have to discuss the modality of aPD: we can use data from Dutch and Canada in that discussion that put all aspects into the account: aPD in the long term is offering cost-savings (especially because you do not need transportation thrice per week to a center HD) [18, 19].

Besides the issue of reimbursement, the problem of teaching the home-care nurses in the technique of PD has to be solved. In different countries (Brazil, Canada, China, Denmark, France, Italy), the use of standardized teaching programs is often established [4]. The time for these programs is going from 2 up to 20 hours. From my experience, the nurse staff of home care loves to provide aPD.

What about the life quality of patients on aPD? An analysis from Canada provides us with data about this topic [20]. In a direct comparison between aPD and HD in elderly patients, they found a significant tendency to more depressions in aPD; however, the other scales were not significantly different. Another study looked directly to aPD versus self-PD [21]. It comes to no surprise that with aPD the role model of independence was reduced.

One of the most pressing issues with home-based dialysis is the rate of hospitalizations. In a study patients on HD ( $n = 198$ ) were matched to aPD patients ( $n = 203$ ) and then compared [22]. The median in both groups were 1 hospital visit spanning 4 days.

Following the arguments, a nephrologist should be eager to start such an aPD program. Most important at the beginning is the decision, who is taking the task of assistance. In some healthcare systems, a network of home-care services by nurses is available; then, they should be trained, and reimbursement must be guaranteed. In other systems, a nursing home-based program could be the only solution that is available and achievable. My personal recommendation is that the single specialist could contact the national kidney society for further support, since often only the national level can bundle the often-spare experiences in a national health system regarding this topic. What is extremely important is the backbone of an existing successful PD program at the local kidney center. Bringing all these aspects together, enthusiasm of the staff together with the doctor should be the fundament to start a program of aPD. The patients will gain the most.

### 3. Conclusion(s)

Putting all these aspects together, then aPD is a safe and in some countries widely used modality. The issue of reimbursement and education of home nurse staff must be solved. However, for elderly and frail patients, aPD offers a change to use the advantages of PD for these population, and on a local level, the provider should seek ways to establish aPD programs.

### Conflict of interest

There is no “conflict of interest” declaration necessary.

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