Peritoneal dialysis in elderly patients is not widely applied, although data show that PD is often preferred by elderly patients. This paper describes current restrictions to the application of PD in elderly patients and their possible solutions. This includes (contra) indications to PD as well as data on patients’ preference, quality of life specific for elderly patients and data on outcome of PD in older patients. The possibility of assisted peritoneal dialysis is offered as a challenge to the dialysis team.

**Keywords:** peritoneal dialysis; elderly; quality of life; assisted PD

**Introduction**

In developed countries elderly people are the fastest growing group of end-stage renal disease (ESRD)—and thus potential new dialysis—patients. In these countries, >50% of incident patients are older than 65. The mean age of prevalent patients has increased from 55 to 60 in most European countries [1,2]. In the Netherlands, in 2004, more than 50% of the incident dialysis patients were over 65 years old, 17% of them were aged more than 75 years [3]. Large differences exist in the choice of dialysis modality between countries [3]. Peritoneal dialysis (PD) is applied in 10% of the elderly patients in the Netherlands [4], as compared with 21% in France (C. Verger, personal communication). Higher age is associated with more medical and social contra-indications against PD and patients’ preference for haemodialysis (HD). Predialysis care leads to stronger patients’ preference for PD. Female patients are more likely to choose PD than the male elderly [5].

This article describes the possibilities and problems of PD in elderly patients.

**Contra-)**-indications

The decision to initiate dialysis in the elderly should be taken with care [6]. Not initiating dialysis should be given as an option for all patients. Major determinants for not initiating dialysis in octogenarians were late referral, social isolation, functional dependency and diabetes [7]. Nutritional status, late referral and functional dependency were independent predictors of death in the elderly in the same study.

Dementia, in particular, should be excluded before proposing dialysis treatment [8]. Geriatric consultation can be of help in these cases. The possibility of cessation of PD should be discussed on a regular basis with the dialysis team and with the patients and their caretakers. Data from the United States Renal Data System (USRDS) registry indicates that death is the result of withdrawal of dialysis in 25% of the patients >65 years. The European Renal Association (ERA) registry gives similar results, but large differences exist between countries [1]. Progressive dementia or comorbidity can be reasons for withdrawal of therapy. Adequate follow-up for these patients should be provided.

The medical advantages of PD over HD in the elderly include better preservation of residual renal function, and the continuous character of the therapy which avoids large volume and electrolyte shifts. Cardiovascular stability is better preserved by PD than by HD, and diet is less restricted. Middle molecules are probably better removed. In addition, vascular access is not necessary, transport times are less and holidays are easier to plan (reviewed in [9]).

**Patients’ preference and quality of life**

Elderly patients value their independence. They are willing to initiate dialysis therapy as long as independence is sustained and symptoms are relieved [10]. This can be achieved, especially with assisted (automated) PD (C. Verger, personal communication) [11]. When given the choice, more patients would prefer PD.
over HD [12]. Compared with HD patients, elderly PD patients have a better sense of well-being, especially concerning their mental state [13].

Quality of life (QoL) is an independent determinant of survival [14]. The QoL in older people is particularly associated with lack of symptoms and independence. Patients on PD tend to have less dialysis-related symptoms and better QoL than their HD counterparts [15,16]. Automated peritoneal dialysis (APD) patients were found to stay independent longer than continuous ambulatory peritoneal dialysis (CAPD) patients [16].

Age-specific problems

Because of advanced age, the elderly have more comorbidity, which sometimes leads to a preference for HD [2]. Delirium and depression should be treated before the treatment is initiated [14]. Age-specific training problems include loss of hearing and vision, slower cognitive function, apraxia and temperature instability. Most of these can be solved by using special training programmes, adapted educational materials and aids that are available, such as clampadapters. Extensive work-up of elderly patients is advised by Dratwa and van der Poel [9].

Timely referral is crucial in these patients because both the choice for dialysis and their training will take more time and effort than in a younger group of patients. Late referral is common among elderly patients [9,17–20]. In a survey among French-speaking Belgian patients, the chance of late referral increased from 30% in patients under 54 years of age to 40% in those over 70 years (C. Verger, personal communication).

Outcome

A number of studies have now shown similar survival and equal or better quality of life in the elderly compared to their younger counterparts [11,15,16]. The North Thames Dialysis Study investigated 174 elderly patients on PD for 1 year. Both mental and physical scores of QoL were similar between PD patients and elderly people from the general population. Adjusted estimate of outcome showed a positive PD QoL at 6 months in incident PD patients, compared to their HD counterparts [15]. Mortality and hospitalization rates were also similar. In APD patients, the European APD Outcomes Study (EAPSO) showed similar technique survival in patients aged >65 years compared to those <50 years. Mental QoL was similar between age groups, whereas physical QoL was somewhat lower in the older patients on APD [21].

Complications of PD are similar between the groups in most studies [16,20], although some older studies show higher risk of peritonitis [22,23]. The APD does not lead to higher peritonitis incidence. In the study of Povlsen and Ivarsen [11], peritonitis incidence was one every 23.5 patient-months, while 52 home care centres were involved. Gram-negative peritonitis is more common compared with younger patients [21,23].

Hospitalization is necessary more often once peritonitis occurs, and also because of comorbidity. However, Brown et al. [21] showed similar rates of hospitalization in HD vs PD patients, with higher costs for HD patients. They also reported that 1/3 of the elderly PD patients were never hospitalized during the 2 year study.

The risk of malnutrition is higher in the elderly patients [24,25]. This is caused by the decrease in appetite, higher intra-abdominal pressure by the dialysate, constipation, socio-economic factors and comorbidity. Close monitoring is required using adequate measures [25] and dietary consultation. Malnutrition can be treated by the inclusion of aminoacid-based dialysis solutions (Nutrineal) in the dialysis schema [26,27]. Catheter-related complications, such as exit site infections and malposition occur in similar rates as in younger patients [22,28–30]. Catheter malposition is often caused by obstipation and can be treated by laxatives or catheter reinsertion. Hernias and leakage have been reported to occur more often [31], or at similar incidence levels [32]. They can often be repaired by surgery. Special attention should be given to cardiovascular problems. They are the main cause of death in all ESRD patients [24].

Assisted peritoneal dialysis

With the use of APD most of the problems of apraxia and cognitive problems can be avoided, and even a handicapped patient can be treated in an home environment or a nursing home. For practical reasons, automated PD can be used more easily in APD because it requires less contact with the home-care assistants. Adequate training and regular contact with assistants is crucial to the success of APD. A 24 h backup should always be provided by the dialysis centre.

In France, between 1992 and 1997, elderly patients were treated with preference for PD, assisted by home nurses. Socio-economic and logistic factors (distance to dialysis centre) were important determinants of this policy. The percentage of patients treated with APD increased from 17.5 between 1992 and 1995 to 42% between 1996 and 1999 (C. Verger, personal communication). A recent retrospective report from Denmark showed promising results: elderly patients treated with assisted automated PD had similar survival and peritonitis rates as in the general PD population. However, the necessity for catheter reposition was higher than in the general PD population. This could be attributed to the acute start on PD in some of the patients [11].

In the Netherlands, a recent survey by the Hans Mak Institution showed that home-care assistance is sufficiently organized and is not an obstacle for choosing PD in the elderly (E. Boeschoten, data not published). This is only possible when reimbursement of these home-care nurses is provided. A recent problem concerning the financing of APD at home by the home-care instances seems to be solved (E. Boeschoten, personal communication).
**What is restricting PD in the elderly?**

Currently, prejudice against PD in the elderly is based mainly on the feeling of the (pre)dialysis team that ‘the patient will not be able to do it’. Data shows that elderly patients prefer their independence as long as QoL is sustained [10,11]. In general, PD can be advised as a safe treatment with similar outcomes as in younger patients. With a multidisciplinary approach it is possible to identify patients who will benefit from PD. Age-specific problems can be solved or adapted to by a dedicated team. Timely referral and initiation of dialysis are even more important than in younger patients [6]. The APD allows more of the elderly to be treated in their home environment. Adequate training and reimbursement of home-care assistants is crucial to its success.

**Conflict of interest statement.** None declared.

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