Summary

In the last decade the number of patients older than 75 years old on dialysis has approximately doubled. The care of the elderly, who require chronic dialysis by either peritoneal dialysis (PD) or haemodialysis, is more complex than the management of their younger counterparts, due to their frequent comorbid conditions, numerous impairments, functional limitations, and lack of social support. Also, the ideal timing of dialysis initiation has not been clarified in the elderly with slowly progressing chronic kidney disease. Nephrologists may have to identify the factors that may affect negatively the outcome of patients so as to start dialysis earlier. Multiple comorbidities may contribute also to the final decision to select peritoneal dialysis as a more suitable home modality than center haemodialysis. Though quality of life and mortality seem to be similar in elderly patients on both haemodialysis and peritoneal dialysis, selection bias may confound these findings. Among several methods of peritoneal dialysis, assisted PD seems to be a suitable method for elderly patients. Finally, the decision to withhold or withdraw from dialysis frequently challenges the nephrologist who looks after elderly patients.

Key words: elderly, quality of life, peritoneal dialysis, survival.

Introduction

There is not a standard definition for the term “Elderly”. However, most developed world countries have accepted that a person with a chronological age of 65 years or greater is an ‘elderly’ person. Obvious differences separate patients 65-75 years old, those 75-85 years old and those over 85 years of age, although they are treated as the same group. For this reason it is important to specify the age of the study group when applying a study’s results to the individual patient.

Before 1980, most elderly patients over age 60-70 with end-stage kidney disease (ESKD) were denied dialysis, often because primary care physicians did not refer them to the nephrologist because of reservations about their prognosis, the quality of life on dialysis and occasionally because of a lack of resources. Besides, until recent years, the evidence to inform us about decision-making for or against dialysis was lacking, particularly in the group of elderly ESKD patients who are frequently affected by multiple comorbid-
ties and thus dialysis may not be expected to increase their survival. Moreover, as elderly people are commonly sensitive to lifestyle changes, any negative consequence of initiating dialysis might be harmful.

Several of these doubts have been recently removed and today the elderly is the most rapidly increasing group of ages among dialysis population. Thus, according to excerpts from the U.S. Renal Data System (USRDS), whereas the incidence rates of end-stage kidney disease are no longer rising among persons younger than 65 years of age, they have continued to increase among those 65 years of age and older. Incident rates of treated ESKD patients peak in the 70- to 79-yr age group at >15,000 patients per year, or 1543 per million of same age population (Figure 1).³

This paper will review the present experience of renal replacement therapy in the elderly population. Unfortunately, we have only a few randomized controlled trials (RCTs) of elderly patients on dialysis and most of the information available comes from case series and/or several registries.

Starting dialysis in the elderly versus conservative management

Initiation of dialysis greatly affects quality of life (QoL), incurs important financial costs, and mandates use of precious dialysis resources, whereas possible risks include accelerating the decline of residual renal function and dialysis related complications. These negative consequences of initiating dialysis can be especially deleterious in the elderly ESKD patients, particularly in those with multiple comorbidities. Thus, before starting dialysis in the elderly ESKD patients, nephrologists may have to predict the dialysis factors that may affect the outcomes as well as to decide for a possible more safety way in postponing the start of a dialysis therapy providing a conservative management.

Recently published studies tried to address questions regarding the effects of dialysis on morbidity and mortality in elderly ESKD patients and the possible use of conservative management. A paper from UK renal units aimed to compare survival rates in elderly patients with stage 5 chronic kidney disease (CKD) managed with dialysis or conservative treatment, and to pinpoint variables associated with survival in this population. They concluded that choosing dialysis rather than conservative management is associated with better survival in patients aged >75 years with advanced CKD, but not in those with multiple comorbidities, particularly those with ischemic heart disease. Moreover, some small studies suggest that mortality or QoL outcomes do not differ very much among selected patients who undergo dialysis and those who do not. There are also QoL data suggesting that older dialysis patients have similar levels of social functioning and mental health as younger dialysis patients but usually poorer physical function.

Dialysis modalities (PD and HD)

Since both hemodialysis (HD) and peritoneal dialysis (PD) have their own advantages and disadvantages as renal replacement therapies (RRT), it is essential to individualize the elderly patients’ therapeutic needs in order to achieve the best outcomes. In addition, each patient’s wishes, disabilities, availability of dialysis centers, and proper social support have to be taken into account when choosing dialysis options.

Hemodialysis is the main renal replacement therapy used in the elderly requiring dialysis (Figure 2). Among those ESKD patients over 75 years of age, 96% are undergoing in-center HD, while continuous ambulatory peritoneal dialysis or continuous cycler peritoneal dialysis (CAPD/CCPD) accounts for approximately 3.5%, and only 0.3% are treated with home hemodialysis.

In most countries, older patients are less likely to start on peritoneal dialysis compared to younger ones, even in countries with a comparatively high use of PD. Thus, in Denmark, Belgium, the Netherlands and the United Kingdom the percent-

![Figure 1. Incident rates of treated ESKD per million of population, by decade. Data from the USRDS 2008 annual report³](image-url)

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age of patients starting on PD is 20–41% for the patients aged 45–64 years old, 13–25% for patients aged 65–74 years and only 9–13% for those aged >75 years. However, there is a high variability among dialysis centers within the same country, reflecting the different approaches in providing information about dialysis, and possible biases against PD use among individual doctors and nurses, who might influence modality selection by ESKD older patients. As an example, in the UK, the percentage of incident patients over 65 years old starting on PD varies from 5 to 55% among different centers.

A study among 1347 patients looked at the choice of dialysis modality when patients were given free choice. Except for the 1/3 of patients who had a medical or social contraindication to start on a particular modality, patients older than 70 years were six times more likely to choose HD than those aged between 18 and 40 years. Older age, female gender and those living alone, were common characteristics of those who had not selected PD. However, patients who had received predialysis care and education about the various dialysis modalities were much more likely to choose PD than those who had not.

When should dialysis be started in the elderly?

We do not know the ideal timing of dialysis initiation in the elderly with slowly progressing chronic kidney disease (CKD), although there is a recent trend for elderly patients to start on dialysis at a higher level of residual kidney function than younger patients. Selection bias and possible errors in accurate estimation of residual GFR probably can confound this difference. Several studies demonstrated that after age 40, renal function is decreasing by 10% per decade, without a change in serum creatinine, whereas an 80-year-old with a serum creatinine of 1 to 1.5 mg/dl has approximately one-half of the GFR of a 40-year-old. Therefore older patients tend to become uremic at lower levels of serum creatinine than younger patients.

Peritoneal dialysis

According to URDS data peritoneal dialysis was used by 12% of patients between 20 to 55 years old, and only 4% of patients >75 years of age. This underutilization of PD is due to several reasons, including the unfamiliarity of the health-care provider with the use of PD in elderly patients.
Jager et al believe that many elderly would select PD if they were fully informed about this modality well in advance. Furthermore, an increasing use of the less expensive PD has clear financial advantages, because elderly patients constitute the faster growing segment of dialysis population. Benain et al. showed that PD saved money for the French Health Care Insurance, even with the additional cost of paid visiting nurses to assist PD.

Overall, peritoneal dialysis represents a continuous and stable therapy, that is free of the rapid changes in hemodynamic and fluid status associated with hemodialysis that often are poorly tolerated by older patients. An important advantage of PD therapy over hemodialysis is that it can be performed at home, although it requires some degree of mobility, adequate vision, and the ability to learn in order to achieve an independent application. Otherwise, PD may require assistance.

A recent study from Hong Kong has demonstrated that in patients older than 65 years who are capable of performing their own exchanges, self-care PD provides an independent life away from hospital. Thus a high percentage of elderly PD patients become autonomous, although they require a slightly longer training time, as was expected.

A French study described the experience of peritoneal dialysis as their first and exclusive dialysis therapy in 213 patients over 75 years old, for a mean period of 21±20 months (cumulative time of 4551 patient months). Thirty patients had an effective autonomous life in which they carried on normal activities, 26 patients lived in institutions and 187 lived at home. One hundred and two patients (102) were cared for by a private nurse at home, and 46 were cared by a family member. Most (152) patients were treated with three exchanges per day and used a non-disconnect system (175 patients). The rate of peritonitis was one episode per 16.8 patient-months. Patient survival was 74%, 59%, 45%, and 19% at one, two, three, and five years, respectively. The causes of death varied with a higher frequency of cardiovascular causes (48.3% of the 116 deaths). Thirty-three patients died in less than six months including 18 patients who died in less than three months. The high mortality was due chiefly to age and poor general status. These authors concluded that elderly patients with ESKD can be treated with long-term PD with relatively good results. The availability of private visiting home nurses is very important and frequently is a prerequisite to maintaining these elderly patients at home. Furthermore, the higher failure rate of AV-fistulae, may also explain why elderly patients are more frequently treated by PD when assisted PD is available. Finally, assisted PD at home (aPD) was associated with a good quality of life.

Possible drawbacks of PD in the elderly

Comparing the physiology of peritoneal dialysis system between the elderly and younger patients, emerging data suggest that during the aging process peritoneal mesothelial cells change and may become more prone to inflammation. Also elderly patients may have a higher incidence of intestinal pathology, and constipation. In addition, many elderly patients have undergone previous abdominal procedures that will increase the risk of adhesions and potential abdominal wall leaks, hernias and catheter malfunctions.

Comparisons on survival between HD with PD in the elderly patients

Survival on dialysis is considerably lower among elderly patients than in young patients. As, over the past decade, there has been an important increase in the number of people with multiple medical problems who require dialysis, Jassal et al. tried to determine the life expectancy of elderly patients after starting dialysis, as well as to identify possible changes in survival rates over time. All patients aged 65 years or older (14,512 patients) who began dialysis in Canada between 1990 and 1999 were identified from the Canadian Organ Replacement Register, treated in two periods: 1) 1990-1994 and 2) 1995-1999. Despite increased comorbidity over the two study periods, the unadjusted 1-, 3- and 5-year survival rates among patients aged 65-74 years at dialysis initiation rose from 74.4%, 44.9% and 25.8% in period 1 to 78.1%, 51.5% and 33.5% in period 2. The respective survival rates among older than 75 years patients at dialysis initiation increased from 67.2%, 32.3% and 14.2% in period 1 to 69.0%, 36.7% and 20.3% in period 2. This survival advantage persisted after adjustment for diabetes, sex and comorbidity in both age groups (65-74 years: hazard ratio [HR] 0.76, 95% confidence interval [CI] 0.72-0.81; 75 years or more: HR 0.86, 95% CI 0.80-0.92). However the characteristics of the individual patient and the co-existing comorbidity such as cardiovascular disease...
are more accurate in predicting survival than the numerical age. In another study that compared patients over 75 years with chronic kidney disease stage 5 who were offered and accepted dialysis lived longer than those who declined it. However, this difference in survival did not appear in those on HD who had high number of comorbidities16.

To investigate the effect of renal center characteristics on mortality and technique failure (TF) rates, Schaubel et al17 used data obtained from the Canadian Organ Replacement Register, namely from 17,900 patients who received PD between 1981 to 1997. They found that as the cumulative number of treated PD patients increased, covariate-adjusted mortality significantly decreased (p<0.05). Similarly a significant but weaker correlation was present between the number of PD patients treated and technique failure. As the percentage of patients starting on PD increased, TF rates decreased significantly. No association was observed between a center’s academic status and mortality or TF rates. These results imply that a center’s experience with and the degree of specialization toward PD have a strong impact on PD outcomes. It has been suggested that a center’s propensity to exploit technical and non-technical advances in PD increases directly with these variables. It is also possible that, through experience, centers become more adept at identifying appropriate patients for PD.

Recently, McDonald et al reported that long-term survival among older patients on PD is poorer than that on HD, although the differences between these modalities appeared several years after the initiation of dialysis18. Comparing also mortality of elderly patients on HD versus PD in a propensity score method, Winkelmayer et al. found that the subgroup of diabetics may do better on HD19.

**Assisted peritoneal dialysis (aPD)**

In France, elderly patients have been treated by assisted PD (aPD) for more than a decade and data from the French Registry REIN show that incident end-stage renal disease patients older than 75 are more likely to be treated by PD than other patients20; the same group reported that, in patients older than 75 years, unplanned HD and PD were associated with an increased risk of death compared to planned dialysis21. These results point out to the importance of taking time to plan for dialysis treatment, which may have an impact on the patients’ outcome, especially for PD. Therefore, one can postulate a centre effect that may play a significant role in the elderly patients’ outcome particular on PD.

A more recent French study22 aimed to report the outcome of elderly patients on PD in a country where assisted PD is available. This retrospective study was based on the data of the French Language Peritoneal Dialysis Registry (RDPLF). They analyzed 1,613 patients older than 75 years (the mean age at dialysis initiation was 81.9 years) who started PD between January 2000 and December 2005; 545 patients had a Charlson comorbidity index (CCI) >9. Of these patients 1435 were treated by CAPD and 1232 were on assisted PD. The median patient survival was 27.1 months, which in the multivariate analysis was associated with sex, age, modified CCI, method of assistance and underlying nephropathy. The median pure technique survival was 21.4 months, which in the Cox model was associated with the modified CCI; the association did not remain significant after adjustment for the centre size. The median survival free of peritonitis was 32.1 months. Neither the modality of assistance nor the centre size was associated with peritonitis risk. The authors concluded 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 assisted peritoneal dialysis has to be taken into account.

Dimkovic et al23 reported also that a major obstacle that affects any outcome of an elderly dialysis patient is the greater disease burden. However, this factor may be overcome if patients start on PD with assistance provided by visiting helpers (nurses or others) or people at home, mostly family members. They suggested that assisted PD is suitable for, but not limited to, elderly patients who cannot perform PD for themselves at home. In considering assisted model of care one must contemplate the frequency of visits, the type of health care, and several other tasks to be performed for the patient at home. These authors believe that aPD can be cost-effective when compared with in-center hemodialysis, because clinical experience worldwide shows that aPD offers an acceptable level of survival for most elderly and disabled patients. No significant difference in modality-related complications has been reported from those seen in self-performed PD.

Recently, the US Renal Physicians Associa-
tion/American Society of Nephrology (RPA/ASN) work group formulated guidelines concerning the initiation and withdrawal of treatment. The group involved multiple disciplines, including physicians, ethicists, nurses, social workers, and clergy. The RPA/ASN guideline Working Group recognized the potential tension that exists between an evidence-based approach that leads to a particular recommendation for a particular group of patients (eg, those who are terminally ill from cancer) and a normative approach that addresses the response to specific patient with a unique set of values. The Working Group recommended that neither the outcomes for a particular group of patients nor the preferences of an individual patient should be ignored. They urged that nephrologists strike a balance between the two as they engage patients in the process of reaching shared decisions. Their nine recommendations are: 1) Shared decision-making, 2) Informed consent or refusal, 3) Estimating and presenting to the patient prognosis, 4) Conflict resolution, 5) Advance directives, 6) Withholding or withdrawing dialysis, 7) Special patient groups, 8) Time-limited trials, and finally 9) Palliative care.

References


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