

# Geriatric considerations in older persons with end-stage kidney disease

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## ABSTRACT

Decision-making in older persons with end-stage kidney disease (ESKD) regarding dialysis initiation is highly complex. While some older persons improve with dialysis and maintain a good quality of life, others experience less benefit and multiple complications due to a high morbidity burden and (early) mortality. Geriatric impairments are highly prevalent among this population and these impairments may complicate the care of an older person with ESKD. Knowledge of these impairments can potentially help improve care and decision-making regarding dialysis initiation and advance care planning. Therefore, the aim of this review is to give healthcare providers an insight into the existing literature on geriatric impairments in older persons with ESKD. Furthermore, specific areas of concern will be discussed, in combination with some practical advice.

## KEYWORDS

Dialysis, decision-making, geriatric impairments, older persons

## INTRODUCTION

Currently, more than half of the prevalent and incident dialysis patients in the Netherlands are 65 years or older.<sup>1</sup> Taking patients who forego dialysis into consideration, the percentage of older patients among those with end-stage kidney disease (ESKD) is likely to be much higher (although exact numbers are currently lacking).<sup>2</sup> Furthermore, as the Dutch population is aging,<sup>3</sup> this number is likely to increase even further over the coming decades. The elderly population is a heterogeneous group, in terms of comorbidities, polypharmacy, and geriatric

impairments,<sup>4</sup> such as cognitive impairment, accidental falls, functional impairment, symptoms of depression, and frailty.<sup>4</sup>

As a result of this heterogeneity, decision-making about the initiation of dialysis and dialysis modality is highly complex. While some older persons function very well and improve through dialysis therapy, others experience high morbidity<sup>5-8</sup> and increased mortality, especially early after dialysis initiation.<sup>9-11</sup> As geriatric impairments influence prognosis,<sup>12</sup> knowledge of the presence of such impairments can potentially help decision-making about dialysis treatment and advanced-care decisions in older persons with ESKD.

In this paper, we use four cases to illustrate the heterogeneity in older persons with ESKD and address different geriatric considerations that may be relevant in decision-making regarding treatment for ESKD.

## TREATMENT OPTIONS FOR OLDER PERSONS WITH ESKD

Treatment options for older persons with ESKD do not differ from younger patients and include kidney transplantation, in-centre haemodialysis, (assisted) home haemodialysis, (assisted) peritoneal dialysis (both automatic peritoneal dialysis (APD) and continuous ambulatory peritoneal dialysis (CAPD)), and maximal conservative management. Kidney transplantation is an option in selected older persons (e.g., the Eurotransplant Senior Program (ESP), in which a kidney of a deceased patient older than 65 years is donated to a patient older than 65 years); however, due to a shortage of transplants and health requirements, the majority of older persons will start dialysis<sup>1</sup> and remain on this therapy for the rest of their life.

Haemodialysis can take place at a centre or at home, in which case, the additional help of trained home care or family members can be arranged for patients who are not capable of performing dialysis independently in the home setting (assisted home haemodialysis). The same can be arranged for peritoneal dialysis, which is performed in the home setting. In general, patients treated by haemodialysis are dialyzed 3-4 times a week for approximately 4 hours; for patients treated by CAPD this is on average 4 times a day with varying lengths. In addition, APD facilitates night dialysis, usually with only one connecting and disconnecting moment from the dialysis equipment. Potential advantages of home dialysis include flexibility in the treatment schedule, less time spent in the hospital, and no need for transportation to and from the centre.<sup>13</sup> Home haemodialysis also facilitates more frequent and shorter treatment schedules, which may yield a shorter post-dialysis recovery time, fewer symptoms of depression, and improved sleep quality.<sup>14</sup> Subsequently, there is evidence that home dialysis leads to a higher quality of life.<sup>15</sup> However, in addition to the logistical and financial barriers,<sup>13</sup> patients and their caregivers sometimes find the burden of responsibility for self-care too much.<sup>16</sup> Furthermore, some patients, such as older persons with a limited social network, value the advantage of social contacts of in-centre dialysis and patients may feel more confident with the availability of specialized medical support. No differences are seen in survival rate<sup>17</sup> and quality of life<sup>18</sup> between older patients on (assisted) peritoneal dialysis and haemodialysis.

Patients can choose maximal conservative management (MCM). This treatment focuses on symptom management to maintain quality of life as much as possible. Over the past years, there has been increasing evidence that MCM has a survival similar to dialysis therapy in patients older than 80 years and in patients older than 75 years with a high comorbidity burden.<sup>19-21</sup> Furthermore, with a similar quality of life,<sup>22,23</sup> patients on MCM treatment are less likely to be hospitalised<sup>22,23</sup> and more likely to die at home or in a hospice.<sup>8</sup>

## CASES

Patient A is a 75-year-old female with ESKD caused by diabetes. Her medical history includes peripheral artery disease, recurrent urinary tract infections (UTI), and multiple deliriums caused by infections. She is married and has no children or additional home care. Since her last UTI six months ago, Patient A appears slow, depressed, and is more dependent on her husband in her daily activities. After consulting a geriatrician, she was diagnosed with vascular type dementia, which was a surprise for Patient A, her husband, and the nephrologist

who had treated her for several years. After deliberating with Patient A and her husband, the nephrologist advised against starting dialysis. The patient and her husband agree with conservative management.

Patient B is an 85-year-old male with ESKD caused by hypertension and diabetes. He has a severely reduced exercise capacity due to ischemic heart disease, for which he has been treated with multiple percutaneous interventions. He has also experienced multiple fall incidents of unknown aetiology. Patient B is married and has an adult son. In addition to home care three times a day, his wife and son support him with transport and help with daily activities. Due to his limited exercise capacity and a recent fall, he walks only inside the house with a walking cane. Although he is dependent on his surroundings, he enjoys life to the fullest and is determined to live as long as possible. Despite some hesitation from his treating nephrologist, he decided to start in-centre haemodialysis.

Patient C is a 76-year-old female with ESKD caused by amyloidosis. For the amyloidosis, she has been treated with multiple courses of chemotherapy, which resulted in haematological regression and also complaints of polyneuropathy. Consequently, Patient C experiences difficulty with undoing buttons and getting pills out of a box. In addition to the amyloidosis, she has a medical history of osteoporosis and multiple abdominal herniations (umbilical, epigastric) for which she was treated with surgery. She is a widow with two children and four grandchildren. Because of progression of the ESKD, Patient C had to choose whether she wanted to start dialysis. Patient C chose peritoneal dialysis so she could maintain her active lifestyle and remain independent.

Patient D is an 82-year-old male with ESKD caused by hypertension. He has a medical history of deep vein thrombosis and pulmonary embolism treated with anticoagulants. Patient D is fully independent and lives with his wife. In the past, a good friend of Patient D with ESKD chose maximal conservative management and experienced this as a good way to maintain quality of life; in the end he experienced a peaceful death at home. Although Patient D is fit and has an active lifestyle, he decided that dialysis will have too much of an impact on his quality of life. Therefore, he chose maximal conservative management.

## GERIATRIC IMPAIRMENTS

### Cognitive impairment

Cognitive impairment is an important issue in patients with ESKD. As illustrated in Patient A, it is an impairment that is frequently overlooked by both healthcare providers and family members.<sup>24</sup> For example, in a study in

haemodialysis patients, 37% had a severely impaired cognition when tested, but only 3% of all patients had a documented history of cognitive impairment.<sup>25</sup> The prevalence of cognitive impairment in this study is in agreement with previous research, with most studies reporting more than half of older patients with ESKD having mild to severe cognitive impairment.<sup>4,25</sup> This is much higher compared to an age- and sex-matched general population and patients with a less severe degree of chronic kidney disease (CKD).<sup>26</sup>

The cognitive domains that are frequently affected are attention and executive function.<sup>26</sup> Both are crucial in making an informed decision because patients have to understand the information required for the decision and have to realise how the information given will impact their own life and circumstances. Patients should also be able to use the information and subsequently, logically reason which treatment option they prefer.<sup>27</sup> Although it makes sense that decision-making capabilities can be affected in patients with severe cognitive impairment,<sup>28</sup> the effect has rarely been studied in ESKD.<sup>29,30</sup>

Besides potential problems with decision-making, cognitive impairment is associated with a higher risk of mortality<sup>31-34</sup> and dialysis withdrawal.<sup>33-35</sup> For example, the average time until death for incident dialysis patients with dementia was 1 year compared to 2.7 years in patients without dementia.<sup>34</sup> Although it is not completely clear how different aspects of dialysis (e.g., clearance of uremic toxins,<sup>36</sup> shifts in cerebral blood flow<sup>37</sup>) affect cognitive impairment, the start of dialysis in the older population is more often associated with a loss of function than improvement.<sup>38,39</sup>

A possible solution to the diminished attention span is to dose information over multiple appointments and healthcare providers should regularly check if the information is understood (for example, by asking the patient to paraphrase the given information). In addition, since problems in executive functioning can lead to difficulties in anticipating new situations, health care providers should ascertain if patients can comprehend the potential implications of their decision for their daily life.<sup>27</sup>

Therefore, screening for cognitive impairment in the older population with ESKD is recommended, for example, by the use of the Montreal Cognitive Assessment (MOCA).<sup>40</sup> In cases where cognitive impairment that interferes with self-care and therapy adherence, referral to a memory clinic is advisable. This information can subsequently be used for prognostication and to assess decision-making capacities.

### Depression

Depression is present in approximately one-quarter of patients treated by maintenance dialysis<sup>41</sup> and one-third

of the patients display depression symptoms.<sup>42</sup> Similar rates of symptoms of depression are found in older patients who started dialysis therapy (31%) and in older patients with ESKD who chose maximal conservative management (35%).<sup>4</sup> This is an important issue to be aware of since depression symptoms are associated with a lower medical adherence, a higher morbidity,<sup>43</sup> withdrawal from treatment,<sup>44</sup> and mortality.<sup>43,45</sup>

To the best of our knowledge, no research has been performed on the influence of depression on decision-making in older patients with ESKD. Previous studies in the general population, however, have shown that patients with depression are less likely to accept a life-sustaining treatment,<sup>46</sup> while remission of depression is associated with an increase in acceptance of treatments.<sup>46</sup> Therefore, it is recommended to timely screen for depression and to refer patients suspected for depression for additional diagnostics and management, preferably before making a definitive decision regarding dialysis.

Of note, late onset depression is associated with dementia.<sup>47</sup> This is illustrated by Patient A, for whom the differential diagnosis of her lethargy, depressive symptoms, and increased care dependence was broad and may consist of uraemia, depression, adjustment disorder, medication-induced mood disorder, and cognitive impairment. Because depression is treated differently from depression symptoms caused by other disorders, making a correct diagnosis is essential. Therefore, in cases of doubt, it may be beneficial to consult an expert (e.g., psychiatrist, geriatrician).

Depression symptoms can be indicated by the 36-Item Short Form Health Survey (SF-36) or RAND-36.<sup>48</sup> The diagnosis of depression is made by the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5) criteria, which include mood and somatic symptoms during at least two weeks, not explained by a somatic disease.<sup>49</sup> The latter criterion poses difficulties in ESKD, as uremic complaints such as insomnia, fatigue, and a decreased appetite frequently overlap with the somatic symptoms of depression. Sometimes the course of the symptoms can help in discriminating between depression and progression of ESKD. For example, if new complaints in combination with depression symptoms and/or anhedonia are not accompanied by changes in physical examination and/or laboratory results, the diagnosis of depression should be considered.

Although based on sparse data of medium quality, there is some evidence that different non-pharmacological (e.g., exercise training, cognitive behaviour treatment)<sup>50</sup> and pharmacological treatment strategies<sup>50-51</sup> can be beneficial in treating depression in patients with ESKD. Nevertheless, in addition to attention for a reduced renal excretion of medication, caution is advised in the older population for

the potential anti-cholinergic effects of anti-depressants (mainly tricyclic antidepressants), which can lead to a broad spectrum of symptoms including sedation, postural hypotension, confusion, and even delirium.<sup>52</sup> Furthermore, a higher risk of falling is reported with the use of anti-depressants.<sup>53-55</sup> Thus, the potential benefits and burdens should be carefully weighed each individual patient.

### Accidental falls

Patient B experienced multiple falls of unknown aetiology. Falls are not uncommon in the older population with ESKD, with between approximately 30% and 55% of patients on dialysis therapy falling every year.<sup>56-58</sup> Interestingly, the post-dialysis initiation period is especially at high-risk for fall incidents.<sup>57</sup> Injurious falls in the dialysis population are also common<sup>58</sup> and are associated with loss of independence<sup>54</sup> and increased mortality.<sup>59</sup> In addition to injury, falls can also lead to fear of falling, which can subsequently lead to loss of mobility and social isolation.<sup>60</sup>

Most risk factors for accidental falls in older persons with ESKD are similar to the general population and include age, a previous fall, diabetes, frailty, mobility impairment, use of anti-depressants, and decrease of systolic blood pressure.<sup>60</sup> Thus, additional analysis of a patient such as Patient B in a falls clinic before the start of dialysis is recommended to identify potentially modifiable risk factors. In the general population there is extensive evidence that a multifactorial fall risk assessment and management program can lower the number of falls<sup>61</sup> and subsequently fall-related injury.<sup>62</sup> In addition, considering most patients do not tell their healthcare providers they have experienced a fall,<sup>63</sup> it is recommended to periodically ask patients with ESKD about falls.

### Functional impairment

Approximately 80% of older persons with ESKD are dependent on others in one or more often instrumental daily activities.<sup>4</sup> These include activities that are necessary for self-care (such as bathing, dressing, and continence) and more complex tasks that are essential for independent living (such as shopping, housecleaning, and telephone use). To perform these tasks, cognition, physical ability, and perceptual capacities are necessary. For example, Patient C has severe polyneuropathy in both hands, limiting her ability to perform activities that require fine motor skills. This could potentially affect her ability to connect to the PD machine. This is important to consider, especially since the main reason Patient C had chosen peritoneal dialysis was to remain independent. Irrespective of treatment modality, the start of dialysis in older persons is frequently accompanied by a loss of independence, both in the short<sup>7</sup> and long term.<sup>64</sup>

For example, we showed that in older patients starting dialysis, 40% experienced a decline in functional status within six months.<sup>7</sup> This rate was even higher in frail older adults.<sup>7</sup> Similar results were seen in very frail nursing home patients, of whom only 13% maintained their functional status one year after the start of dialysis.<sup>5</sup> In contrast, the limited data on functional course of maximal conservative management shows that loss of independence does not occur until the month before death.<sup>65</sup> In addition, functional dependence is strongly associated with mortality,<sup>66,67</sup> therapy withdrawal,<sup>66</sup> time to first hospitalisation,<sup>67</sup> and can negatively influence quality of life.<sup>68,69</sup> Regarding Patient C, this information could have assisted her, her caregivers, and treating physicians in making a well-informed decision.

To the best of our knowledge, there is no consensus on the most appropriate tool for assessing functional performance in older patients with CKD.<sup>70</sup> A combination of a self-reporting questionnaire and field tests (e.g., sit to stand, gait speed, and the 6-min walk) is recommended for assessing physical performance.<sup>70</sup> Self-reporting questionnaires that are frequently used to assess daily function<sup>48,70</sup> are the Katz ADL<sup>71</sup> (assessing activities of daily living), Lawton Brody Instrumental ADL<sup>72</sup> (assessing instrumental activities of daily living), and questionnaires assessing quality of life (36 Short Form Health Survey (SF-36) and RAND-36).

A potential treatment strategy to maintain functional status is to improve physical functioning. Different studies showed that regular exercise is able to improve physical function<sup>73</sup> by enhancing aerobic capacity, muscular function, cardiovascular function, and walking capacity.<sup>74,75</sup> Interestingly, patients who performed physical exercise during dialysis sessions demonstrated more improvement of physical function compared to patients who exercised outside the dialysis unit.<sup>73</sup> This is probably the result of a better compliance with exercise during dialysis.<sup>74</sup> Hence, it may be beneficial to encourage physical activity in older persons with ESKD, for example, by offering intradialytic exercise.

### Caregiver burden

Caregivers of patients with ESKD are at risk for high burden, because of a high prevalence of symptoms (e.g., fatigue, anorexia, sleep disturbance, pruritus)<sup>76</sup> and the frequent coexistence of other impairments, such as cognitive impairment, depression symptoms, and functional impairment.<sup>4</sup> High caregiver burden is associated with a decreased quality of life and more depression symptoms for the caregiver.<sup>77</sup> Also, for the patient it is important to maintain good social support, as poorer social support is associated with a higher mortality risk,<sup>78,79</sup> lower adherence to medical care,<sup>79</sup> and poorer physical quality of life.<sup>79</sup> On the other hand, being

a caregiver also comprises positive experiences, such as feelings of personal growth and gratification.<sup>80</sup> The help of a caregiver can potentially give both the patient and the caregiver more freedom. For example, in the setting of home dialysis, a caregiver who facilitates the dialysis procedure can create more flexibility in the treatment schedule. Thus, when aiming to optimise care for older patients, supporting the caregiver, and regularly inquiring about the burden of care they experience, is as important as the support given to patients themselves.

### Frailty

Frailty is frequently defined as a “biological syndrome of decreased reserve and resistance to stressors, resulting from cumulative declines across multiple physiologic systems, resulting in increased vulnerability to adverse outcomes”.<sup>81</sup> Multiple operationalisations of frailty exist, and the diagnostic method strongly affects the prevalence of frailty. Irrespective of this, at least half of ESKD patients appear to be frail.<sup>82</sup> Previous research in ESKD shows that frailty is associated with functional deterioration,<sup>7</sup> hospitalisations,<sup>83,84</sup> and mortality.<sup>85</sup> Therefore, for frail older persons in particular, conservative management seems to be a good alternative to dialysis therapy as these patients are less likely to benefit from dialysis.<sup>70</sup>

One manner in which frailty is operationalised is through the number of geriatric domains identified as impaired in a geriatric assessment. This multidimensional assessment includes physical, functional, and psychosocial domains and includes all the impairments previously discussed. For older ESKD patients, a regularly performed geriatric assessment (e.g., yearly or when major events occur) may be beneficial to ensure a timely diagnosis of issues that are potentially modifiable or can influence treatment decisions and care provision. However, it is still unclear how a geriatric assessment will affect decision-making regarding the start of dialysis and dialysis modality. This is the focus of two studies currently ongoing in the Netherlands: the ‘Pathway for Older Patients Reaching End Stage Renal Disease (POLDER)’<sup>86</sup> and ‘DIALysis or not Outcomes in older kidney patients with Geriatric Assessment (DIALOGICA)’.<sup>87</sup> Frailty can also be assessed by frailty screening tools. In nephrology, the most frequently used frailty screening instrument is the Fried Frailty Index. This is an instrument that uses five criteria mainly focused on physical frailty (unintentional weight loss, exhaustion, physical activity, walking speed, and handgrip strength).<sup>81</sup> Although physical frailty is related to poor outcome,<sup>7,84,85,88</sup> it is important to note that non-physical geriatric impairments (e.g., cognitive impairment, depressive symptoms, social impairment) that are previously discussed and may be important for

decision-making would not be observed using the Fried Frailty Index. Frailty screening instruments should therefore be used cautiously, as many vulnerable patients will be potentially missed.<sup>82</sup>

The list of geriatric impairments is more extensive than described above. For the purpose of this review, we chose to limit the discussion to geriatric impairments with considerable influence on quality of life or potential influence on survival, and consequently of importance in the decision-making process regarding dialysis initiation.

### HEALTH OUTCOME PRIORITIES IN OLDER PERSONS WITH ESKD

In our case descriptions, fear of the potential loss of quality of life was the reason Patient C chose MCM, despite his good clinical condition. Although he had the physical reserves and the resilience to undergo dialysis, his good condition could potentially decrease substantially by starting dialysis (e.g., much time spent on dialysis, potential dialysis-related complications, and hospitalisations).<sup>23</sup> Therefore, MCM should always be actively discussed as an option for the (older) patient with ESKD, irrespective of their health status.

It is important to realise that most older persons may identify more with problems or outcomes that are not disease-specific.<sup>89</sup> For example, a recent study in the United States showed that most older persons with advanced CKD value maintaining independence as their top health priority.<sup>90</sup> In addition, a study in older non-CKD patients with a limited life expectancy, demonstrated that if the outcome is increased survival, but with severe functional impairment or cognitive impairment, most patients would not choose to undergo treatment.<sup>91</sup> However, as illustrated with Patients B and D, how quality of life is experienced is very personal and strongly affects their treatment decisions. Identifying and prioritising patients’ healthcare goals (e.g., living independently at home, take care of a loved one as long as possible) should be an important part of ESKD management in all patients. Knowing healthcare goals can also help in discussing end-of-life choices. A recent study showed that in only 35% of the patients with advanced CKD, the healthcare provider was aware of their patients’ top health priority.<sup>90</sup> This suggests that these questions are currently insufficiently discussed in clinical practice. Another study showed that older ESKD patients had lower rates of advance care planning near the end of life compared to similar patients dying of cancer, resulting in higher treatment intensity at the end of life and more patients dying in the hospital.<sup>92</sup> This is also illustrated by Patient D, who valued dying at home highly - something that is relatively easy to accomplish if this is established early.



## CONCLUSIONS

As the ESKD population is aging, geriatric impairments in this population become more prevalent and decision-making regarding dialysis becomes more complex. Knowledge about geriatric impairments can help advance decision-making regarding dialysis therapy and modality by improving information on prognosis and decision-making capacities. Treatment strategies can also be implemented to optimise health and quality of life. A geriatric assessment covers all important geriatric impairments and can therefore be used to identify these problems. The information retrieved from a geriatric assessment can be used to support the

decision-making process regarding dialysis and may help in making an individualised treatment plan according to patients' personal health goals, preferably together with family and/or potential caregivers.

## DISCLOSURES

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The authors have no conflicts of interest to declare.

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