




CKJ REVIEW

How to make a shared decision with older persons for end-stage kidney disease treatment: the added value of geronto-nephrology

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ABSTRACT

Improving care for older people with end-stage kidney disease (ESKD) requires the adaptation of standards to meet their needs. This may be complex due to their heterogeneity in terms of multimorbidity, frailty, cognitive decline and healthcare priorities. As benefits and risks are uncertain for these persons, choosing an appropriate treatment is a daily challenge for nephrologists. In this narrative review, we aimed to describe the issues associated with healthcare for older people, with a specific focus on decision-making processes; apply these concepts to the context of ESKD; identify components and modalities of shared decision-making and suggest means to improve care pathways. To this end, we propose a geronto-nephrology dynamic, described here as the necessary collaboration between these specialties. Underscoring gaps in the current evidence in this field led us to suggest priority research orientations.

Keywords: cognitive impairment, end-stage kidney disease, frailty, nephrogeriatrics, shared decision-making

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INTRODUCTION

The increasing number of older people reaching end-stage kidney disease (ESKD) challenges nephrology teams in deciding optimal care pathways. In ESKD, therapeutic options range from intensive cure approaches to palliative care. Assessing the benefits and risks of each option at the individual level is challenging due to the great heterogeneity of the population. A spectrum of phenotypes characterizes this heterogeneity, based on multimorbidity, frailty, geriatric syndromes and functional dependence (see Box 1 for definitions of the different concepts used). The interplay of multimorbidity, functional heterogeneity and a person's preferences introduces complexity into healthcare for older people, testing the adaptability of healthcare professionals and systems to meet each person's unique needs. This complexity necessitates interdisciplinary approaches, such as gerontonephrology, described here as the necessary collaboration between these specialties.

Box 1: Definitions of concepts relevant for care of older persons

- **Heterogeneity:** Heterogeneity in ageing implies greater interindividual variability in clinical and biological parameters, leading to different phenotypes ranging from robust to highly multimorbid persons accumulating geriatric syndromes that lead to functional dependency in activities of daily living. This warrants greater attention when caring for older people and supports comprehensive, thorough and potentially time-consuming geriatric assessment [101].
- **Multimorbidity:** Contrary to comorbidity, which refers to additional diseases beyond an index condition, multimorbidity refers to multiple co-occurring diseases [102]. A distinction can be made between those that are concordant (i.e. sharing pathophysiological characteristics), sometimes referred to as comorbidities when related to an index disease, and those that are discordant, added without any specific relation between each other. Three main approaches have been proposed to define multimorbidity [5]: number (commonly ≥ 2 co-occurrent chronic diseases), number and severity, and number and functional implications. The latter is appropriate to identify persons with complex health problems who need multidisciplinary care, and is thus relevant for clinical care of older people.
- **Geriatric syndromes:** Geriatric syndromes are a group of clinical conditions, such as delirium, cognitive impairment or falls, commonly found in older persons, that do not necessarily fit into discrete disease categories. They are often multifactorial, meaning they result from a combination of multiple underlying factors rather than a single cause. These syndromes are highly prevalent in the older population and have significant implications for their health and quality of life.
- **Frailty:** It is conceptualized as a reduction of multiple physiological reserves, increasing vulnerability to stressors [103]. Frailty can be identified through a phenotypic approach based on physical criteria, assessed during clinical medical examinations using methods like Fried's criteria [104] or Rockwood's clinical frailty scale [105]. Alternatively, more comprehensive approaches,

such as the one proposed by Gobbens et al. [106], define frailty as a combination of physical, psychological and social factors. These factors are interrelated and contribute to disruptions in the medico-social pathway.

- **Autonomy:** Autonomy is the capacity of a person to make informed and independent decisions. This concept hinges on cognitive abilities, notably decision-making processes and the ability to evaluate the risk-benefit balance concerning one's own health or condition, based on biographic memory and self-awareness perception.
- **Functional independence:** Functional independence refers to an individual's ability to perform daily life tasks without assistance from others. This involves both executive functions, which are cognitive processes including planning and problem-solving, and the physical ability to execute these tasks.

In this article we investigate how the specific needs of older people intersect with the challenges of ESKD, showing the need to reinforce collaboration between nephrology and gerontology teams. Recent literature reviews [1-3, 4] have highlighted some challenges in this area, but interdisciplinary approaches are lacking in clinical practice and research. We aimed to describe the issues associated with healthcare for older people, with a specific focus on decision-making processes; apply these concepts to the context of ESKD; identify components and modalities of shared decision-making (SDM) and suggest ways to improve care pathways, such as the geronto-nephrology dynamic. Underscoring gaps in the current evidence in this field led us to suggest priority research orientations. We believe these elements are vital for clinicians caring for older persons with ESKD, aiming to enhance collaboration among patients, caregivers and clinicians as well as the overall quality of care.

THE NEED TO ADAPT CARE TO OLDER PERSONS: WHY AND HOW?

A person-centred approach

The care of older people requires a shift towards a comprehensive medical perspective, where the impact on outcomes that are meaningful to the person is the primary consideration [5]. Current clinical care and research often struggle to move away from a single disease paradigm, which is unsuitable for older persons with multimorbidity [6]. In support, the American Geriatrics Society has outlined key principles that shape person-centred comprehensive care strategies [7, 8]: the active incorporation of a person's preferences, fostering SDM with families and caregivers, attention to evidence limitations and interpretation of medical literature tailored for this heterogeneous population. As such, clinical decisions must be framed within the context of harms, burdens, benefits and prognosis, considering factors such as remaining life expectancy and quality of life (QoL). This person-centric approach ensures consideration of the unique needs and preferences of each individual as part of an SDM strategy.

SDM

In the 1980s, SDM was presented as an ideal model of treatment decision-making. It is seen as a fair compromise between the paternalistic model (physician decision-making authority)

and the informed decision model (limiting the physician's role to information transfer). SDM engages the patient in a more autonomous decision-making process while sharing responsibility for subsequent issues [9]. SDM is thought to be a way to support patient empowerment, limit biased decision-making and limit implicit persuasion [10]. Patient participation in the decision-making process has been associated with positive outcomes [11].

Some specifics of SDM with older persons should be emphasized. First, SDM involves at least two participants (the physician and the patient), but frequently more. In geriatric care, treatment decision-making frequently involves caregivers and relatives and decision-making processes are often based on a triad rather than a dyad [12]. However, physicians must guarantee that the process remains person-centred. Second, preferences for a passive role in treatment decision-making are more frequently observed in older people [13]. While it is the person's right to choose the model of medical interaction he/she prefers, it is the physician's role to ensure that this is not induced by systemic ageism [14] or cognitive decline that would warrant support. Finally, SDM should be implemented as an open-ended process, involving progressive negotiation and discussion. As such, it should not be seen as a procedure aimed at ensuring the traceability of a result, but rather as the co-construction of a decision.

Towards integrated care

These challenges and standards for care of older people constitute an opportunity for the healthcare community to adopt person-centred care, in which 'an individual's specific health needs and desired health outcomes are the driving force behind all health care decisions and quality measurements' [15]. Integrative models of person-centred care are proposed in the literature [16], and may be implemented in daily clinical practice, despite existing barriers at the person level, healthcare professional level and organizational level [17]. Notably, insufficient coordination of professionals across healthcare sectors has negative consequences for health outcomes [18].

ESKD TREATMENT CHOICE IN OLDER PERSONS: WHY IS IT SPECIFIC AND COMPLEX?

Multimorbidity, frailty and heterogeneity

Older people with severe chronic kidney disease (CKD) and ESKD are usually described as having a high burden of co-occurring diseases, especially cardiovascular, associated with negative outcomes [19, 20]. Besides multimorbidity characterizing this population, geriatric syndromes (see Box 1) such as cognitive impairment, depression, falls and impaired mobility are highly prevalent and associated with a poor prognosis [21–23]. CKD is considered as a direct risk factor for some of these syndromes, partly due to CKD-related chronic inflammation and uraemic toxicity [24]. Of note, the higher prevalence of geriatric syndromes hides the high heterogeneity of the older ESKD population [25], characterized by a continuum of persons with variable degrees of multimorbidity and frailty. This heterogeneity adds a layer of complexity to ESKD treatment decision-making process.

Kidney replacement therapy (KRT) and cognitive decline

In clinical practice, it is difficult to assess whether functional decline and geriatric syndromes are due to uraemia/ESKD or to

other factors. Their reversibility through KRT is therefore uncertain. CKD-associated cognitive impairment illustrates this complexity. Indeed, the accumulation of uraemic toxins may contribute to cognitive disorders [26], with potential reversibility through KRT. However, the main supposed mechanism is through cerebrovascular lesions [27], probably explaining why albuminuria, a marker of endothelial dysfunction, seems more strongly associated with cognitive impairment than estimated glomerular filtration rate (eGFR) [28]. Cerebrovascular lesions contribute to impairment of executive functions, important for reasoning, judgment and decision making [27], and frequently co-occur with neurodegeneration. Given its underlying mechanisms, cognitive impairment is not expected to improve completely following KRT, especially in older persons. It might even worsen, e.g. due to cerebral impact of haemodynamic variations during haemodialysis (HD) [26], or post-kidney transplantation (KT) delirium. Therefore, KRTs should be seen as typical stressors in the conceptual definition of frailty (see Box 1).

Treatment options for older persons

Comparisons between HD and peritoneal dialysis (PD) techniques in older people have recently been reviewed elsewhere [2, 29]. No wide differences in survival rates have been reported between persons treated with HD and PD [30].

Conservative care is another treatment option in ESKD that combines all usual treatments for CKD except KRT and a palliative care approach [31]. Nephrologists' confidence with this treatment is heterogeneous, and they may not systematically propose conservative care as an alternative to dialysis. Consequently, older people rarely report having received information about it [32, 33]. This may result from a lower perceived prognosis associated with conservative care compared with dialysis, even if the survival benefit of dialysis is lower in persons >80 years of age or with a high comorbidity burden [34]. Many studies have compared survival between dialysis and conservative care among older people, but such studies are strongly limited by indication bias: persons who choose conservative care are older and more frequently frail and multimorbid [34]. This often goes with a preference for quality rather than quantity of life [31].

KT is associated with better survival as compared with a matched dialysis population. Even if the benefit was unclear when compared with persons still on the waiting list in a French study of older people [35], it is now recognized that older age itself is not an acceptable reason to exclude persons from assessment for KT and individualized discussion about benefits and risks. Indeed, KT can improve the quantity and QoL in carefully selected older persons. Besides the assessment of multimorbidity, surgical feasibility, immunological and infectious risks, KT candidates should be screened for geriatric syndromes, such as cognitive impairment, poor physical performance and frailty, which are associated with poor outcomes after KT [23, 36]. However, operationalization of frailty assessment and determination of the degree of frailty that will make KT unreasonable for a given person are difficult [37].

Competing risks, dynamics of decisions and treatment

Optimal timing to start the decision-making process is challenging in older people with severe CKD. On the one hand, these persons generally experience a slower eGFR decline than younger ones [38]. On the other hand, emergency start of dialysis and short nephrologist follow-up duration are associated

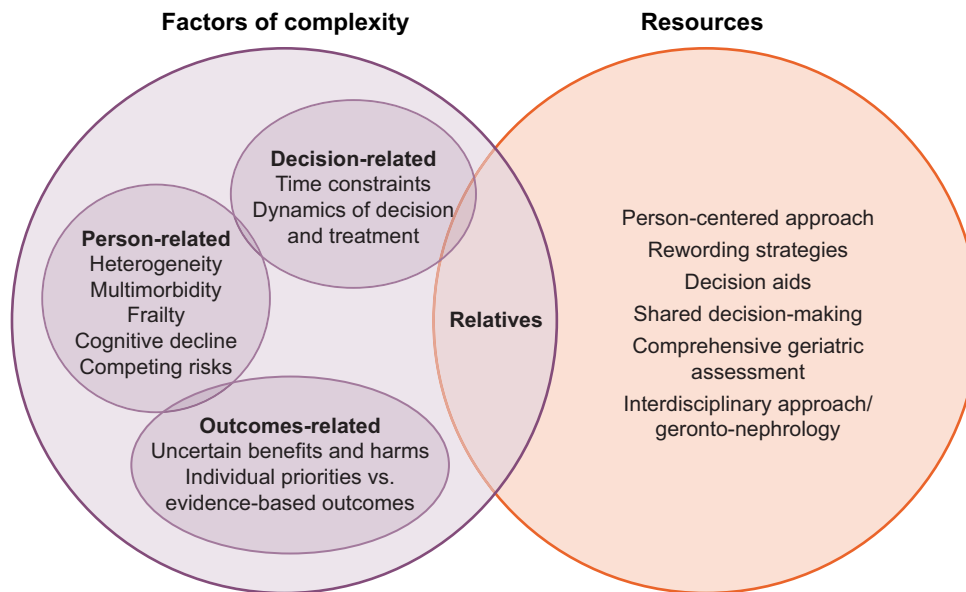


Figure 1: Factors of complexity and resources for decision-making of ESKD treatment in older persons. The decision-making of ESKD treatment in older persons is a highly complex and challenging process. This is due to multiple factors related to the person, the decision-making process and the outcomes (purple circles). One specificity of ESKD is the dynamics of the decision and treatment: time between the decision and the actual start of treatment is frequently unpredictable and may last several years. Useful resources to facilitate the decision-making process are presented (orange circle). See Table 1 for the strengths and limitations of DAs, SDM, CGA and relatives as resources. Rewording strategies is a means to ensure SDM and the responsibility for risks taken (see Table 2 for examples). Geronto-nephrology is described here as the necessary collaboration between the two medical specialties, in an interdisciplinary approach. Relatives stand at the intersection between factors of complexity and resources. One the one hand, they are a third party that may complicate the SDM process, and their treatment preferences often differ from the patient's preferences. On the other hand, they are a valuable source of information (especially regarding functional abilities and cognitive symptoms) and provide support during care transitions.

with poor prognosis in this population [38]. Older people with CKD face competing risks of death and ESKD. European Renal Best Practice guidelines recommend assessing these two risks by using the Kidney Failure Risk Equation and Bansal score, and frailty when ESKD risk is superior to death risk [39]. The rate of eGFR decline should also be an important trigger to initiate the decision-making process. As episodes of acute kidney injury may precipitate this process [38], emergency start of dialysis should be evoked during the discussion with persons and caregivers. Finally, the decision process should be dynamic: it should be regularly reassessed and the opportunity to reverse a decision should be given. Indeed, time between the decision to begin KRT and the actual start of treatment is unpredictable and may last several years. During this period, the medical situation (including frailty and functional status [40, 41]) as well as the person's opinion may change [42].

QoL and healthcare priorities

Usual outcomes in nephrology research, such as mortality, might not be relevant for frail older people. Ramer et al. [43] showed in older persons with severe CKD that the first choice for health outcome priority was to maintain independence (more than staying alive). Patients' priorities were poorly correlated with their nephrologists' perception. In Europeans >65 years of age, fatigue improvement was recently reported during the year following dialysis initiation, whereas sexual symptoms were highlighted as highly prevalent and still worsening during the same period [44]. Comparisons of KRT regarding QoL in older persons are scarce. PD may offer better treatment satisfaction than HD, with equivalent QoL [45, 46]. The effect of KRT on QoL in frail

older persons is difficult to assess and predict. Interestingly, McAdams-DeMarco et al. [47] reported a null effect (probably heterogeneous between persons) of KT on QoL in frail older people, whereas the QoL of frail younger individuals improved following KT. An interpretation could be that the factors leading to frailty are different and more numerous in older persons than in younger ones. As they are not only ESKD-related, they might not be reversed by KRT alone.

Figure 1 summarizes the main factors of complexity in the decision-making process of ESKD treatment in older persons.

HOW TO MAKE A SHARED DECISION WITH AN OLDER PERSON WITH ESKD

Impact of cognitive decline on decision-making autonomy

The clinical decision-making process. Defining adequate person-centred care implies identifying a person's decision and consent to specific treatment options. Decision-making ability requires high-level neuropsychological skills, especially executive function (planning skills and working memory), long-term memory and emotional processing. Indeed, decision-making refers to a process that includes several steps, from analysing a problem, to taking action to solve it [48].

In clinical decision-making, accurately identifying key issues, such as diagnosis and treatment alternatives, is crucial. This process demands a pedagogical approach from healthcare providers to ensure that persons have a clear understanding of their clinical situation before discussing treatment options. Additionally, person self-awareness is essential. Consequently, healthcare providers and patients can collaboratively discuss

treatment options, weighing the risks and benefits according to each person's priorities.

Impact of ageing and cognitive decline on decision-making. There is a modification of decision-making strategies in ageing with preferences for low-risk behaviour and maintenance of stability rather than acquisition of additional value [49]. The arguments used to explain various options should therefore consider this aspect, enabling older persons to structure their decision. In addition, as previously highlighted, multimorbidity associated with severe CKD in older people frequently includes cognitive impairment, notably affecting executive skills. Self-perception issues, such as anosognosia, can be found in situations of associated memory impairment (such as Alzheimer's disease, even at an early stage). This combination can lead an older person to underestimate his/her medical situation, leading to an inappropriate decision by underestimating the potential risks and benefits of different treatment options, as well as their impact on daily life [50].

Assessing decisional capacity. Assessing a person's ability to consent and/or make informed decisions presents a significant challenge in this context [51]. Cognitive screening tests alone, such as the Mini-Mental State Examination (MMSE) or Montreal Cognitive Assessment (MoCA), are insufficient to fully determine a person's capacity for making informed treatment decisions, except in cases of very low scores [52]. Conversely, instruments designed to evaluate consent capacity, such as the MacArthur Competence Assessment Tool (MAC-CAT), primarily focus on the ability to understand and articulate clinical information [53]. However, these tools do not adequately assess whether persons accurately grasp their specific clinical situation, given potential self-awareness impairment and, consequently, the necessity for medical intervention.

To accurately assess a person's decision-making capacity, a holistic, interdisciplinary approach is essential. Within the framework of a comprehensive geriatric assessment (CGA), clinicians should administer a variety of cognitive tests to evaluate memory, executive functions and judgment skills crucial for making informed decisions. Often, due to vascular cognitive impairments associated with severe CKD, such evaluations may indicate a decline in information processing speed and partial impairment of the cognitive abilities relevant to decision-making. This underscores the necessity for decision-making support. In this context, SDM enables the formulation of a care plan tailored to the person's preferences, ensuring that it is adapted to their unique needs.

Uncertainty management in the decision-making process for ESKD in older persons

Assessing the individual expected benefits of treatment options for ESKD is particularly challenging in older persons. Despite the asymptomatic nature of most CKD cases, clinicians, patients and caregivers must share not only the decision-making process, but also the responsibility for any adverse outcomes associated with KRT. The SDM process, aimed at mitigating decisional conflict and potentially improving health outcomes, faces challenges at different levels [54, 55].

Time constraints. First, managing ESKD requires dynamic anticipation from both physicians and patients. They must confront uncertainties regarding the most appropriate treatment option and the optimal timing for preparation and initiation. Time con-

straints pose significant challenges, including the need to share information effectively (a prerequisite for SDM [56]), disease progression and emergency treatment feasibility.

Patient-physician dynamic. Second, within the patient-physician dynamic, persons who are less educated, have limited social support or are older may prefer a passive role in decision-making. They often face challenges in articulating their needs [13], despite a noticeable shift over time and heterogeneity among older people with ESKD [57, 58]. Conversely, some physicians remain unconvinced of the benefits of SDM. The effectiveness of interventions aimed at increasing SDM use by health-care professionals is still uncertain, due to a very low level of evidence, particularly in older people [59, 60]. Vigilance is essential, as decision-making on behalf of others often leans towards safer, more conservative options. However, there is a discrepancy between patients and physicians regarding what constitutes a 'conservative' approach, influencing their perspectives on the risks associated with different therapeutic options. For instance, while a nephrologist may consider dialysis or certain nephroprotection measures as safe due to their potential to extend life, a patient may give precedence to options that ensure the preservation of functional independence and QoL. Thus a detailed discussion of benefits and risks associated with each treatment option is crucial for moving towards SDM. Early identification of a person's individual priorities is therefore critical.

Relatives' roles. Third, while relatives can play a supportive role in the decision-making process, clinicians must remember that medical treatment preferences often differ between older persons and their family caregivers [61]. In the context of dialysis, family members frequently offer practical support, and the family environment significantly influences decision-making [62–64]. It is important to note that caregiver burden tends to increase in the months following dialysis initiation [65]. In geriatric care, caregivers—whether family members or not—are valuable sources of information about the person's cognitive status, abilities and daily needs. However, they should not replace the person in the SDM process. Regardless of age or cognitive function, it is the patient who will directly experience the benefits, harms and constraints of KRT or conservative care. With the person's consent, involving relatives in discussions about treatment decisions and the expected clinical progression is crucial, enabling them to provide appropriate support. However, above all, the decision-making process must remain person-centred.

Systemic factors. Finally, the economic, social and political context, along with organizational constraints, represent significant barriers to SDM for older persons with multiple chronic conditions [59]. Institutional factors, such as resource availability and systemic policies, often influence the choice of dialysis modality (home or in-centre) more than the person's own characteristics or morbidities [66]. Additionally, assessing the cost-effectiveness of SDM strategies presents challenges, complicating the implementation of person-centred care in these contexts [67].

Resources for the decision-making process and their limits

Prognostic scores. To support the decision-making process, several prognostic scores have been developed to predict mortality in the first months or years of dialysis treatment [68, 69]. Recently, a score has been developed for persons choosing conservative care [70]. Some of these scores consider factors associated with poor prognosis, including age, comorbidities

and geriatric syndromes such as cognitive impairment, impaired mobility and malnutrition, which makes them interesting tools. However, some limitations of these scores warrant emphasis. First, these scores primarily focus on mortality as an outcome [3], whereas, as previously described, survival is not necessarily the main priority for older persons [43, 57]. Studies aimed at predicting patient-reported outcome measures (PROMs), such as loss of functional independence, are rare and deserve to be highlighted [65, 71]. Second, these scores were developed using data that describe too roughly the heterogeneity of older people, especially regarding geriatric syndromes, to be used in current practice. For instance, scores derived from the French Renal Epidemiology and Information Network categorize persons as having or not having a ‘severe behavioral disorder’ [68, 69], which does not match a validated definition of a mental illness nor approaches commonly used for cognitive disorders staging [72, 73]. Third, as mentioned earlier, the global health status of older persons changes during severe CKD, and the accuracy of a prognostic score’s predictions tends to diminish over time, as the person’s condition evolves following the initial assessment. Thus these scores may help identify persons for whom a multidisciplinary discussion is needed, but they should not be used as the sole tool to choose or rule out a modality of ESKD treatment.

CGA. The CGA stands as the gold-standard approach for holistically synthesizing an older person’s medical issues and tailoring a personalized care plan. This systematic, multidomain strategy has been demonstrated to effectively maintain functional independence at home [74, 75]. The CGA plays a crucial role in SDM for ESKD for several reasons. First, the scores and domains included in the CGA—especially those related to frailty and cognitive and functional impairments—offer valuable prognostic insights for persons with ESKD [21]. Second, these objective measures are distinct from nephrology teams’ subjective perceptions of frailty [76]. Both objective and subjective assessments of frailty are predictive of adverse outcomes [77]. Lastly, the CGA focuses on aligning the care plan with the person’s individual priorities, addressing one of the main goals and challenges in the SDM process for ESKD treatment, as previously discussed.

Decision aids. Interactive tools such as decision aids (DAs) facilitate SDM in ESKD. These written decision support tools assist persons by making the decision-making process explicit, providing detailed information on options and their benefits/risks and aligning decisions with personal values. A systematic review [78] highlighted that DAs not only improve satisfaction with decision-making, but also enhance patient–clinician communication. The Ottawa Personal Decision Guide [79], available in multiple languages and validated by the International Patient Decision Aid Standards Collaboration, is an example of a non-specific DA that can be used to support SDM. Additionally, multistakeholder versions cater to broader audiences. Specific tools tailored for ESKD have been developed, mainly in English, from public and freely accessible databases (e.g. Penn Medicine Lancaster General Health [80]). Patient associations contribute significantly by addressing decision needs and providing resources in local languages. Although few DAs are designed explicitly for older people, general DAs have proven beneficial [81, 82]. Notably, a randomized controlled trial demonstrated that DA use significantly reduced decisional conflict regarding KRT among persons ≥ 70 years of age with CKD stages 4–5 [83].

Table 1 outlines resources for the ESKD treatment decision process discussed in this section, highlighting their benefits and

constraints. Importantly, these resources are complementary. Fig. 1 summarizes the most useful resources as proposed solutions to factors of complexity of the ESKD treatment decision process with older persons. Fig. 2 suggests a framework for integrating contributors into SDM and care planning in a geronto-nephrology approach.

RECOMMENDATIONS

Deciding on ESKD treatment for older persons facing severe CKD represents a significant challenge. Therapeutic options vary widely, from intensive cure to palliative care approaches. Predicting benefits and risks at the individual level is particularly challenging in this highly heterogeneous population. Additionally, decision-making abilities may be compromised by cognitive decline, which is not always easily assessed. Moreover, health status changes dynamically, and the timing for initiating KRT is unpredictable. While SDM is highly recommended, implementing it effectively can be challenging. To facilitate this, we offer several recommendations for geronto-nephrology clinical practice and future research, summarized in Box 2.

Box 2: Key recommendations for geronto-nephrology clinical practice and research

For clinical practice

- Implement a CGA and build geronto-nephrology collaborations and care pathways.
- Do not assess decisional capacity based on only a cognitive screening test.
- Use DAs to facilitate SDM.
- Involve relatives in discussions, but respect and promote older persons decisional autonomy.

For future research

- Define and use a minimum dataset for geronto-nephrology.
- Assess the feasibility and usefulness of DAs and SDM tools in older adults with ESKD.
- Develop, improve and validate screening tools dedicated to nephrologists to identify older persons requiring CGA.
- Assess the efficiency of interventions based on CGA.

For clinical practice

Implement a CGA and build geronto-nephrology collaborations and care pathways

Several models of geronto-nephrology collaboration facilitate CGA implementation in severe CKD. These include CGA conducted by trained nephrology teams, including specialized nurses [25, 84], the integration of geriatricians within nephrology clinics [84] and referrals to gerontology teams [85, 86]. Multidisciplinary consultations further provide a platform for exchanging perspectives and fostering mutual understanding between medical specialties, which is highly recommended. It is important to recognize that the holistic approach of conservative

Table 1: Resources for the decision-making process of ESKD treatment in older persons.

Resources	Strengths	Limitations	References
Risk scores	Evidence based on large populations	Mainly predict mortality, rarely other outcomes relevant for older persons Do not take patients' opinion and priorities into account Imprecise at the individual level/uses variables that roughly describe older persons' heterogeneity	[3, 68–71]
CGA	Holistic Objective Individualized Focused on what matters most to the person Advice for care plan, for KRT choice and beyond Proven to preserve functional independence in the general population Not redundant with subjective perception of frailty by nephrology teams	Time-consuming Requires geriatric expertise Geriatricians have variable experience in ESKD/KRT No proven added value in ESKD (studies not yet conducted)	[21, 22, 74–77]
Decision aids	Make decisions explicit, increase health literacy Clarify congruence between decisions and personal values Increase patients' satisfaction with the decision Positive effect on patient–clinician communication	Rarely studied in severe CKD Few DAs have been specifically designed for older persons Questionable relevance for persons with cognitive impairment	[78, 80–83]
SDM	Decrease the informational and power asymmetry between physicians and patients Allow sharing of responsibility for decision consequences Limit implicit persuasion Linked to positive outcomes: decision satisfaction, treatment adherence, health outcomes	Time-consuming Requires motivation of both physician and patient to participate Questionable feasibility for persons with cognitive impairment Efficiency not proven Difficult to measure as an outcome	[9–11, 54, 55, 59, 60, 64, 67]
Relatives	Provide additional information on cognition and functional independence Provide support during the disease course	Do not decide for the person Treatment preferences are inconsistent between older persons and family caregivers Family influence on the ESKD treatment decision is associated with dialysis decision regret Involvement in decision may increase caregiver burden	[61–65]

management and the curative strategies of dialysis and transplantation are complementary, not mutually exclusive [4].

Do not assess decisional capacity based only on cognitive screening tests

Assessing a patient's ability to make appropriate care decisions is complex and cannot rely solely on performance in cognitive screening tests such as the MoCA or MMSE [87]. If testing appears necessary, more specific assessment batteries should be performed, targeting executive functions and judgment. When benefit/risk and decision-making capacity are uncertain, we recommend using SDM and rewording strategies. These approaches help patients express what matters most to them, enabling the development of a tailored care plan.

Use decisions aids to facilitate SDM

DAs, as a written tool to guide the decision-making process, improve patient–clinician communication and increase decision satisfaction in different contexts and possibly in older persons with severe CKD [78, 83].

Involve relatives in discussions but respect and promote older persons' decisional autonomy

Relatives play a vital role in providing insights into a person's cognitive symptoms and daily needs, yet their involvement should complement rather than replace the person's central role in SDM for KRT or conservative management. With patient's informed consent, they are also key supporters, particularly during care transitions. To illustrate these suggestions for clinical practice, Table 2 provides examples of useful sentences for discussion with older persons and their relatives.

For future research

To date, incorporating geriatric concepts and approaches into clinical research on ESKD has yielded promising outcomes, particularly concerning the prognostic value of frailty criteria [88] and parameters included in CGA. Future research should focus on operationalizing geronto-nephrology collaborations and care pathways to demonstrate their benefit in enhancing SDM process and care quality, especially for older persons. To this end, we suggest:

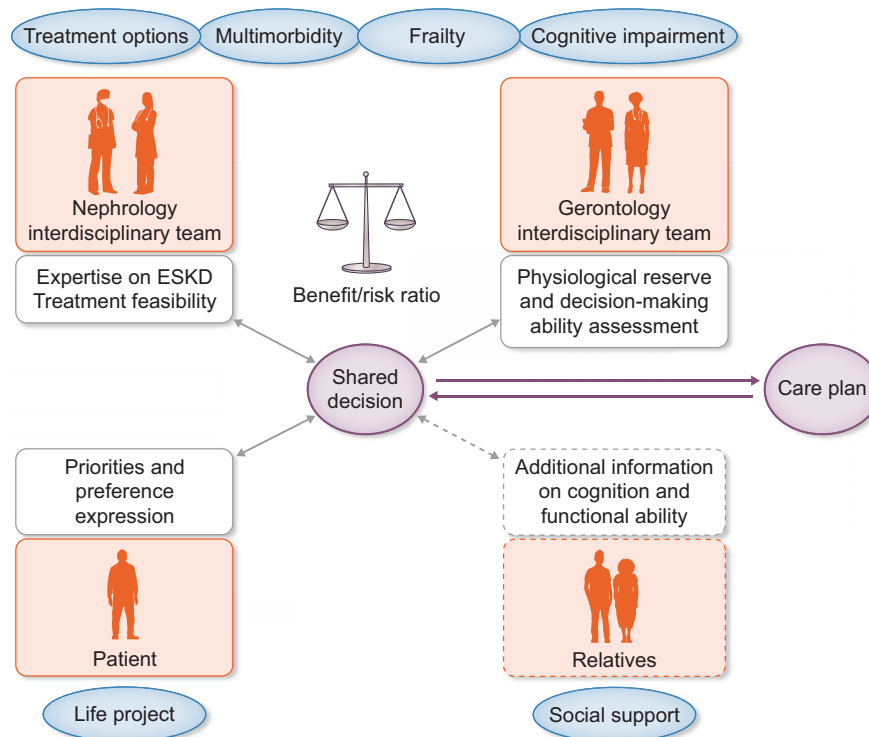


Figure 2: SDM contributors in older persons with ESKD—a proposed model for geronto-nephrology. Protagonists (orange) bring components (white) into the SDM process through the assessment of several domains (blue) in a holistic approach. A shared decision regarding ESKD treatment is the result of an interplay between a nephrologist (or a nephrology interdisciplinary team) and a patient. The nephrology team confronts treatment options for each person's multimorbidity to assess the feasibility of each therapeutic option, and the appropriate option is the one that meets the person's preference and priorities, based on her/his lifestyle. In our proposed model, as frequently as necessary, a geriatrician (or a gerontology interdisciplinary team) provides complementary information about physiological reserve and decision-making ability (in case of cognitive impairment) based on an objective assessment of frailty and cognitive functions. This complementary information is helpful to appreciate the benefit:risk ratio of a treatment option, as well as its appropriateness to the person's priorities. For that purpose, relatives are helpful to provide additional information on functional abilities and cognitive symptoms. They should not replace the person in the SDM process, but should provide social support, particularly important during treatment preparation, initiation and transitions between treatments. Dashed lines are used in the figure because the patient might not have any relative or may not want them to be involved in the SDM process. We assume that this potentially complex and time-consuming model is needed to design an individualized care plan that will meet each person's priorities and that regular reassessment of care plan appropriateness will inform confirmation or revision of shared decisions.

Define and use a minimum dataset for geronto-nephrology

Future research should focus on establishing a detailed, CGA-based minimum dataset, including metrics like functional independence and cognitive impairment [89], guided by the World Health Organization's (WHO) intrinsic capacity model [90, 91], for global validation and use. This would enable comparative studies and detailed analyses on the impact and reversibility of geriatric syndromes in persons undergoing KRT, with a special emphasis on outcomes crucial to older people (as indicated in PROMs), such as QoL and functional independence [92].

Assess the feasibility and usefulness of DAs and SDM tools in older adults with ESKD

Research on tools that facilitate SDM in older persons with ESKD, including DAs, is limited, yet promising [83]. Demonstrating the feasibility and clinical benefits of these tools on person-centred outcomes, particularly decision satisfaction, could enhance their appeal to clinicians and likely lead to improvements in the quality of care.

Develop, improve and validate screening tools dedicated to nephrologists to identify older persons requiring CGA

Developing an effective screening tool is crucial for facilitating geronto-nephrology collaboration and care pathways. Indeed, not all persons with severe CKD or ESKD require evaluation by a geriatrician or a gerontology team, highlighting the need for a CGA-based screening tool that nephrologists can use to identify outcomes and changes that warrant a full CGA by an expert team. Although this approach is employed in geriatric oncology [93], it requires adaptation and specific research for application in severe CKD [94].

To efficiently identify persons who would benefit from a CGA, such a tool would be associated with detailed CGA data and would predict outcomes relevant for older persons with ESKD. Its feasibility for nephrology teams should also be demonstrated. ESKD-specific tools could be built and compared with generic tools, such as the first step of the intrinsic capacity model, recently developed by the WHO [91]. Indeed, pros and cons of the assessment of frailty in ESKD have been discussed, especially before KT [37], and the intrinsic capacity construct could be an answer to concerns regarding the frailty concept [95].

Table 2: Examples of useful sentences for clinical practice.

Discussion	Examples
With the patient To understand individual priorities	What matters most, in your life? What are your priorities regarding health and daily life?
To align the care plan to individual priorities	'Thanks to this strategy, you'll live longer' may have less impact in some patients than 'I think this treatment increases your chances of remaining independent at home'
To ensure shared decisions and responsibility for risks taken (rewording strategies)	What did you understand about the advantages and risks of kidney transplantation/dialysis/conservative care? Do you agree with taking these risks?
With relatives To look for signs of cognitive decline	Did you notice a change regarding his/her personality or behaviour over last years/months? Do you find that his/her memory is not as good as it used to be?
To promote decisional autonomy	Does he/she have trouble organizing or planning new things? Thanks for your opinion, we will take it into account. But I would like to know what your spouse/parent thinks and wants.
To promote support during care transitions	Thanks for being here. It is important that you hear what is going on and what is coming next.

Assess efficiency of interventions based on CGA

To validate the benefits of CGA-based interventions for older persons, research must focus on trials that explore how adaptations to care plans, informed by CGA, impact outcomes, including PROMs. Such studies have previously demonstrated the effectiveness of CGA in enhancing the well-being and independence of older individuals in both community and hospital settings [74, 75], with encouraging findings also emerging from geriatric oncology [96–98], after extensive research. This approach needs to be tailored to the specific demands of ESKD care, particularly considering the dynamic aspects of treatment decisions.

For example, trials should assess the feasibility of implementation of CGA in severe CKD care pathways, as well as the effect of this implementation on decision satisfaction, attainment of self-identified goals [99] and PROMs such as QoL and functional independence. In older KT candidates, the feasibility and efficacy of ESKD-tailored multidomain prehabilitation programs should be assessed [100].

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AUTHORS' CONTRIBUTIONS

F.G. conceived and designed the review and wrote the original draft. M.P., A.G.C. and C.V. provided input for writing and critically revised the manuscript. J.B.B., S.C. and A.H. critically revised the manuscript. T.T. provided supervision on methodology and co-wrote the first draft of the manuscript. All authors approved

the final version of the manuscript and agree to be accountable for all aspects of the work.

DATA AVAILABILITY STATEMENT

No new data were generated or analysed in support of this research.

CONFLICT OF INTEREST STATEMENT

None declared.

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