


CKJ REVIEW

Personalized peritoneal dialysis prescription—beyond clinical or analytical values

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ABSTRACT

Traditionally, dialysis adequacy has been assessed primarily by determining the clearance of a single small solute, urea. Nevertheless, it has become increasingly evident that numerous other factors play a crucial role in the overall well-being, outcomes and quality of life of dialysis patients. Consequently, in recent years, there has been a notable paradigm shift in guidelines and recommendations regarding dialysis adequacy. This shift represents a departure from a narrow focus only on the removal of specific toxins, embracing a more holistic, person-centered approach. This new perspective underscores the critical importance of improving the well-being of individuals undergoing dialysis while simultaneously minimizing the overall treatment burden. It is based on a double focus on both clinical outcomes and a comprehensive patient experience. To achieve this, a person-centered approach must be embraced when devising care strategies for each individual. This requires a close collaboration between the healthcare team and the patient, facilitating an in-depth understanding of the patient's unique goals, priorities and preferences while striving for the highest quality of care during treatment. The aim of this publication is to address the existing evidence on this all-encompassing approach to treatment care for patients undergoing peritoneal dialysis and provide a concise overview to promote a deeper understanding of this person-centered approach.

Keywords: adequacy, goal-directed, peritoneal dialysis, person-centered care, prescription

SHIFT FROM BIOCHEMICAL CONCEPTS OF DIALYSIS “ADEQUACY” TOWARDS A PERSON-CENTERED APPROACH

Since the introduction of dialysis as a Kidney replacement therapy (KRT), determining the optimal dialysis dose to improve patient outcomes has posed an enduring challenge. Various studies have explored the impact of dialysis prescription on patient

outcomes, leading to adjustments in dialysis guidelines [1, 2]. For decades, the concept of “dialysis adequacy” primarily centered on achieving minimum acceptable clearance targets for small solutes, such as Kt/V urea (Kt/Vurea) and urea reduction ratio for hemodialysis (HD), and Kt/Vurea and creatinine clearance (Ccr) for peritoneal dialysis (PD) [3]. Nevertheless, evolving evidence has shown that relying solely on small solute clearance may not be comprehensive enough to accurately assess dialysis

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Table 1: Key points regarding person-centered and goal-directed PD prescription and adequacy [1, 3].

Key points regarding person-centered and goal-directed PD

- (i) Holistic perspective
- (ii) Person-centered approach
- (iii) Shared decision-making process
- (iv) QoL assessment through PROMs and PREMs
- (v) Personalization and flexibility
- (vi) Emphasis on modality transitions

QoL, Quality of life; PROMs, patient-reported outcome measures; PREMs, patient-reported experience measures.

effectiveness or predict patient outcomes, warranting the inclusion of other parameters in addition to small molecule clearance [1–5].

Early studies on PD suggested that higher clearance was associated with better outcomes [6], but it was later revealed that this connection was primarily explained by small solute clearance in relation to residual kidney function (RKF) [2, 7]. Further investigations demonstrated that there was not a clear link between small solute clearance and PD survival [8, 9], challenging the idea that increasing specific clearance thresholds would lead to improved results. Additionally, it was also noted that improved survival was associated with sodium and fluid clearance in order to maintain euvolemia in PD patients [10], leading to modifications in the PD guidelines at that time [11]. All these findings underscored the importance of considering multiple factors beyond small solute clearance when evaluating the efficacy of PD therapy and its impact on patients' outcomes [1, 2, 4, 5, 12].

This shift in understanding is evident in the conclusions of the Kidney Disease: Improving Global Outcomes (KDIGO) Controversies Conference, which advocated replacing “adequate dialysis” with “goal-directed dialysis” [3]. This approach incorporates various measures and goals, including small solute clearance, RKF, volume status, biochemical markers, nutritional status, cardiovascular function, symptoms, and patient experiences and goals. It represents a departure from the traditional “small solute-based approach” to a more holistic “person-centered approach,” acknowledging the multifaceted nature of end-stage kidney disease (ESKD) care and moving away from a one-size-fits-all approach to dialysis [2, 3, 11].

Finally, the International Society for Peritoneal Dialysis (ISPD) guidelines also embraced this new perspective by changing “adequate dialysis” to “goal-directed dialysis,” prioritizing shared decision-making between patients and healthcare teams to establish realistic care goals aligned with patients' life aspirations while ensuring individualized and high-quality dialysis care [13, 14]. This approach emphasizes person-centered care and considers the impact of treatment on patients' lives, recognizing the importance of assessing the burden of time dedicated to adhering to dialysis prescriptions and its impact on patients' daily activities and well-being as vital factors when assessing dialysis adequacy [13–17].

KEY POINTS REGARDING PERSON-CENTERED AND GOAL-DIRECTED PD

After analyzing the evolution of the adequacy concept during the last few years, our attention now turns to the hallmark elements that differentiate the current ISPD guideline from previous recommendations making it unique (Table 1). Some of these key points regarding person-centered and goal-directed PD are:

- (i) **Holistic approach:** this guideline adopts a holistic viewpoint by considering a wide array of factors that impact both, quality of life (QoL) and patient outcomes. The updated recommendations acknowledge that an individual's well-being while on dialysis is influenced by factors beyond the mere elimination of specific toxins [4, 13]. As a result, the prescription of PD must be tailored to the individuals, taking into account their unique clinical situation, preferences and goals [3, 13, 17]. It encompasses the consideration of residual kidney function, volume status, nutritional well-being, cardiovascular health, small solute removal, and bone and mineral management [2, 4, 14, 18]. Moreover, it includes parameters related to QoL, such as patient-reported symptoms, patient-reported outcome measures (PROMs) and patient-reported experience measures (PREMs), in order to align clinical goals with patient preferences considering the treatment burden [15, 17].
- (ii) **Person-centered approach:** person-centered care has emerged as a dominant framework in modern healthcare [15]. The core principle of person-centered care is that medical decisions should reflect the individual's preferences, needs and values [15]. To measure and enhance the effectiveness of person-centered care, both PROMs and PREMs are utilized [14, 15]. In the context of dialysis quality assessment, this shift toward person-centered dialysis acknowledges that comprehensive PD care extends beyond clinical benchmarks to encompass individual needs and objectives [15]. These guidelines underscore the importance of involving individuals undergoing PD in shared decision-making, recognizing their pivotal role in the care process [13, 15]. This transformation is reflected in the use of “person-centered” rather than “patient-centered” terminology, highlighting the consideration of the patient as a unique individual with distinct needs and preferences that extend beyond medical aspects [17]. By embracing this comprehensive approach, healthcare professionals can deliver tailored and effective care, aligning dialysis treatment with each patient's distinct goals and preferences while upholding high quality and safety standards [3, 13]. This vision reflects an evolution in understanding and approaching PD care, taking the patient as a “person” who is affected by the decisions concerning treatment [17], moving beyond simply prescribing dialysis to a model of care that is personalized, coordinated and empowering for the person living with kidney disease [19].
- (iii) **Shared decision-making process:** shared decision-making is the core of adequacy in the recent ISPD publication, which advocates a person-centered approach that involves active collaboration between individuals undergoing PD and their clinical care team. This approach recognizes the holistic challenges faced by these individuals [17]. As mentioned before, the historical emphasis on a “urea and creatinine-centric approach to dialysis adequacy” has neglected the goal “the patient's well-being while living with ESKD” [2, 12]. The global increase in the burden of ESKD has underscored the importance of involving patients in determining care goals and treatment decisions [3]. Person-centered care and shared decision-making are crucial throughout the entire spectrum of kidney disease care, from approaching kidney failure to end-of-life considerations [15, 17]. PD patients often face comorbidities, limited life expectancy, low QoL and psychological challenges. Shared decision-making empowers patients to establish realistic care goals aligned with their life objectives while considering the constraints

of their disease and treatment, thereby maximizing their health-related quality of life (HRQOL) [15, 16]. Providing a range of prescription choices allows tailoring therapy to their objectives, even including the choice to not initiate or discontinue long-term dialysis [13]. This is known as “patient activation,” and enables individuals to take charge of their health and healthcare decisions [15]; it involves collaboration, education and empowerment to align treatment with patients’ goals and optimize their well-being [13, 14, 19–21]. A trusting relationship between the patient and the healthcare team is essential for successful shared decision-making [15]. Respect and involvement in decision-making foster adherence to treatment regimens; moreover, a clear understanding of prognosis helps patients cope with and accept their situation, while empowering them to define their care goals [15, 17, 19].

- (iv) **Ongoing QoL assessment:** the recommendations underscore the importance of regularly assessing patients’ QoL. This involves utilizing PROMs and PREMs to ensure that the dialysis prescription is aligned with individual needs and values [16]. Integrating PROMs allows healthcare providers to gain insight into patients’ perspectives and how PD impacts their HRQOL [15]. The relationship between dialysis dosage and HRQOL is intricate, requiring a delicate equilibrium between the prescribed dose and patient well-being [16]. Inadequate dialysis can lead to more symptoms, while excessive treatment beyond established standards can burden patients and detrimentally affect HRQOL [16]. Recognizing the impact of treatment on patients’ HRQOL is pivotal in crafting an optimal PD prescription that aligns with their preferences and goals. By prioritizing HRQOL evaluations and integrating patient experiences, healthcare professionals can offer personalized care that enhances well-being and overall QoL [16]. The aim is to provide high-quality PD care when planning or modifying a therapy, seeking the highest possible outcomes for the patient, without forgetting the burden that a therapy may cause on an individual’s wellbeing and QoL [3, 13, 15, 17].
- (v) **Personalization and flexibility:** the guidelines promote personalization of dialysis prescription and acknowledge that there is no one-size-fits-all modality for all patients [3]. PD can be prescribed in a wide range of different options, taking into account local resources, the individual’s preferences, lifestyle and clinical needs, as well as the family or caregiver’s specific needs if they are providing assistance [3, 20]. People who select a home dialysis modality value privacy, flexibility and freedom [14, 21]. Flexibility and a person-centered approach are essential components in this process. Healthcare providers should engage in ongoing discussions with patients to understand their evolving preferences and circumstances.
- (vi) **Emphasis on modality transitions:** transitioning between different RRT options is a crucial aspect of managing patients with ESKD. Evolving needs, resources and goals require constant assessment and adaptation of treatment pathways to provide the most suitable RRT options during a patient lifetime [22–26]. This guideline underscores the dynamic nature of patients’ situations and highlights the importance of an integrated care that emphasizes the importance of planning ahead for transitions between dialysis modalities to minimize patient discomfort and anxiety [13, 22]. By tailoring RRT options to evolving needs and goals, healthcare teams can deliver holistic and individualized care, enhancing patients’ well-being throughout their

journey with kidney disease, with the aim of achieving the best possible long-term outcomes [14].

PERSON-CENTERED PD DELIVERY PRESCRIPTION—INDIVIDUALIZED PATIENT CARE

According to ISPD guidelines, PD prescriptions should strike a balance between meeting the patient’s well-being and preferences while adhering to high-quality care standards [13]. This approach considers the patient’s needs, preferences and values as a priority but also takes into account other clinical parameters, including volume status, nutritional status, small solute clearance and RKF [13, 14]. These parameters ensure the delivery of optimal individual outcomes and maintain high-quality care standards [14].

- (i) **Small solute removal:** removal of toxins is an important aspect of PD care that can be estimated using calculations such as Kt/V_{urea} and/or Ccr [3, 14]. These measures are indicators of the amount of dialysis delivered to the patient [20]. However, there is no high-quality evidence supporting the need for achieving a specific target value for these measures [3, 13]. This highlights the shift in dialysis guidelines towards a more person-centered approach, where individual patient needs and preferences take precedence over rigid adherence to specific numeric targets for toxin removal [3, 13, 20]. While raising PD dose might enhance water-soluble molecule clearance, benefits regarding middle molecule clearance remain uncertain [4]. The best way to maximize this clearance remains unclear, with some studies linking it to preserving kidney function and dwell time rather than exchange quantity [4]. Adjusting PD prescriptions might not significantly boost patient outcomes; therefore, lack of robust evidence for toxin removal targets underscores the need for comprehensive PD care beyond numbers, focusing on patient well-being [2, 4, 13, 14].
- (ii) **Residual kidney function:** regular assessment and preservation of RKF are vital for tailoring PD prescriptions, in order to deliver high-quality PD [13, 14, 18]. RKF is associated with enhanced QoL, extended survival and improvement of long-term patient outcomes [18, 27–30]. Diminished RKF leads to suboptimal blood pressure control, which makes maintaining fluid balance challenging as well as increased risk of volume overload [18]. This underscores the importance of RKF for achieving and managing appropriate fluid levels. RKF also affects the clearance of middle molecules and protein-bound uremic retention solutes [2, 18]. Losing RKF leads to a permanent loss of the clearing of these substances, which cannot be fully compensated by increasing PD dosing [18]. Studies from two decades ago emphasized the survival benefits of RKF in PD, contrasting with the inconsistent impacts of peritoneal clearance of small solutes [7, 8, 31]. Recent studies reinforce the link between RKF preservation and survival, highlighting that increased dialysis does not compensate for the decrease in this parameter [32, 33]; moreover, rapid RKF decline is linked to higher mortality, regardless of peritoneal clearance [34, 35]. Factors such as diabetes, hypertension, advanced age, heart failure, recurrent peritonitis and nephrotoxic drugs contribute to swift decline [27, 36–38]. PD modality, either continuous ambulatory PD or automated PD, does not significantly affect RKF preservation [39]. Some strategies are crucial in preserving RKF and optimizing PD care, including diuretics, renin-angiotensin-aldosterone

system inhibitors, calcium channel blockers, controlled salt intake and biocompatible solutions [27, 28].

- (iii) **Volume status assessment:** achieving and maintaining euvolemia is an essential aspect of high-quality PD delivery [13]. By regularly assessing and monitoring fluid status, healthcare professionals can help improve patient outcomes, reducing the risk of complications and improving the overall health and well-being of individuals on PD [14, 40, 41]. Integrating the assessment of fluid status as part of routine care underscores the importance of individualized management in providing high-quality PD treatment [1, 3]. This assessment involves monitoring blood pressure and performing clinical examinations to identify any signs of fluid overload or depletion [30, 40, 42]. An individualized approach is required to manage volume status, since the need of PD patients for adequate volume may vary depending on their RKF, dietary habits (sodium and water intake) and peritoneal membrane function [20, 43–45]. By tailoring the PD prescription to each patient's unique needs while considering both peritoneal ultrafiltration and renal urine output, healthcare professionals can optimize the removal of fluid while preserving the patient's RKF [13, 14, 41].
- (iv) **Nutritional assessment:** adjustments in PD prescription may be necessary based on the patient's nutritional status. Assessing and maintaining good nutritional status is crucial to optimize the well-being and QoL of individuals on PD, and can contribute to improving their outcomes [4]. Individualized strategies to optimize nutrition are essential components of high-quality PD care. Periodic monitoring is essential, and includes assessing the patient's appetite, performing clinical examinations, monitoring biochemical plasma nutrition markers and measuring body weight [4, 13, 14]. Protein-energy wasting is highly prevalent among chronic kidney disease and dialysis patients, predicting morbidity and mortality [4, 14]. It requires nutritional monitoring, early detection and intervention strategies. While markers like albumin, phosphate and electrolytes can indicate nutritional status, they should not be interpreted in isolation due to influences from factors unrelated to nutrition [4, 41]. Hypoalbuminemia is more common in PD compared with HD [4]. Addressing hypoalbuminemia and systemic inflammation is essential for overall nutritional status. Imbalances in serum potassium levels are common in PD, leading to hypokalemia and, less frequently, hyperkalemia. Dyskalemias can harmfully impact peritonitis rates, worsen comorbidities and increase mortality risk [4]. Phosphate control is also crucial, as hyperphosphatemia contributes to increased morbidity and mortality. However, it should not be the sole focus [4]. A comprehensive approach involves dietary management, oral phosphate binders, optimizing PD prescriptions and acknowledging the importance of phosphorus excretion through RKF [4]. Peritoneal membrane characteristics significantly influence phosphate diffusion, underscoring the necessity of understanding these properties to optimize phosphate transport [34–37].
- (v) **PROMs:** these are tools designed to understand outcomes from the perspective of care receivers, potentially enhancing the patient-provider relationship, communication and shared decision-making [46, 47]. Typically, PROMs take the form of self-completed questionnaires that evaluate the presence of symptoms and/or HRQOL [19]. Essential to this approach is presenting the delivery of PROMs as an integral component of clinical assessment rather than a standalone survey [46]. Offering a feedback mechanism to patients is

crucial to close the loop, build trust and encourage accurate future reporting. When utilizing PROM data, it is vital to engage in a subsequent patient-clinician discussion about the responses. Adjustments to PD prescribing may need to be made based on this valuable information to ensure a thorough understanding of the patient's perspective and to promote effective communication in the clinical setting [46].

- (vi) **PREMs:** these measures aim to assess care that aligns with individuals' preferences, needs and values, ensuring that patient values guide clinical decisions [48]. PROMs should be distinguished from PREMs, as the latter offer feedback to healthcare professionals regarding the overall quality of care at a system-wide level. While PROMs focus on patients' self-reported outcomes, including symptoms and QoL, PREMs provide insights into patients' experiences with the healthcare system, helping assess and enhance the overall quality of care provided [47, 48]. Effective implementation requires suitable data platforms for enhanced interaction among patients, caregivers and the care team to stimulate positive changes. Key considerations for seamless integration include creating and validating relevant survey tools, exploring efficient methods for timely data collection, and utilizing platforms like web or texting options [48]. Recently, substantial progress has been made in developing PREMs specifically for home dialysis. An exemplary model is the HomeDialysis Care Experience instrument, the first rigorously developed tool for assessing a 26-item PREMs in PD and home HD (HHD) [49].
- (vii) **Symptom control:** to address symptom burden effectively, in order to enhance the patient's QoL and well-being, it is crucial to include symptom assessment in the patient's medical record and incorporate it into the overall clinical evaluation [46, 50]. The importance of assessing symptom frequency and burden among dialysis patients is being increasingly recognized [46]. However, the optimal frequency of routine symptom assessment in dialysis patients to improve clinical outcomes without overwhelming them remains unclear [46, 47]. A reasonable approach might involve conducting routine symptom assessments every 1–3 months, taking into account factors such as the assessment's purpose, the patient's health status, available resources, patient preferences and the specific assessment tools used [46]. A person-centered approach to symptom assessment and management improves the dialysis experience by combining clinical considerations with patient experiences [47]. Involving patients in decisions and tailoring treatment accordingly ensures that the PD prescription aligns with individual needs and values while upholding quality care standards. This comprehensive assessment approach is crucial for providing high-quality PD care and optimizing patient outcomes [13, 14, 47].

We recognize the challenge inherent in the theoretical measurement of adequacy targets within this new person-centered perspective. The feasibility of this innovative and more holistic approach is particularly difficult in countries where reimbursement policies are closely linked to specific treatment targets or in settings where quantitative metrics are indispensable for assessing outcomes or reimbursement [13, 14]. Therefore, implementing this approach requires consideration of the assessment of multiple parameters, as mentioned above, including symptoms, individual experiences and goals, residual renal function, volume status, biochemical measures, nutritional status, cardiovascular function and small solute

clearance, as well as sense of well-being and satisfaction, to help ensure the delivery of high-quality PD care, going beyond a few analytical parameters [13, 48]. Given the considerations outlined above, the broad implementation of this person-centered care approach is anticipated to necessitate substantial modifications in nephrologist training and the overarching healthcare delivery system, with a particular emphasis on aligning financial incentives with these principles [13, 14]. While acknowledging the challenges involved, it is important to note that overcoming these hurdles is not impossible!

TAILORING DIALYSIS PRESCRIPTIONS TO PATIENT NEEDS: A COMPREHENSIVE APPROACH

A person who chooses to undergo PD requires education to be able to participate in decisions regarding PD prescription [13, 15]. It is crucial to explain the factors influencing the prescription and encourage patients to express their preferences based on this information [15, 19, 21, 51]. Listening to the patient's experiences is key for the PD care team to tailor treatment individually, avoiding a one-size-fits-all approach [3]. Modifications in the PD prescription over time may be necessary due to medical reasons such as decreased RKF, insufficient peritoneal clearance or volume overload [15]. Maintaining open communication with the patients is essential to help them understand and accept these changes aiming for high-quality, person-centered dialysis with minimal treatment burden [13, 14, 15, 51].

The choice of a PD modality typically begins with a decision between continuous ambulatory PD (CAPD) and automated PD (APD) [15]. This decision is primarily driven by patient preferences, while also considering financial considerations [51–53]. Data from the PD Outcomes and Practice Patterns Study (PDOPPS) indicate varying prevalence rates of CAPD and APD across different countries, with a global increase in APD use due to its convenience for patients and positive clinical outcomes [54, 55]. Traditionally, the selection of a dialysis modality was significantly influenced by peritoneal membrane transport characteristics. Patients with high peritoneal transport were recommended for APD due to shorter dwells that reduce the risk of fluid reabsorption. In contrast, patients with slow peritoneal transport benefited from CAPD as they maintained osmotic gradients longer. However, factors such as body size, abdominal characteristics, RKF, personal circumstances and treatment goals now play a crucial role in choosing the ideal modality [20, 21, 30, 51]. Survival studies typically show no difference between modalities, though APD survival often excels, especially in patients with high transport. Recent analyses suggest minimal differences in various outcomes between CAPD and APD. The appeal of APD lies in improved daytime autonomy and QoL, but its successful implementation depends on resources, training and infrastructure. Modality selection should consider age, comorbidities, self-care abilities, caregiver support and socioeconomic status, allowing for informed shared decision-making and adaptable prescriptions as patients' needs evolve over time [15, 20].

Incremental PD

Incremental PD (IPD) is an approach that gradually adjusts RRT as kidney function declines [13, 56, 57]. It offers a personalized strategy for starting PD and is applicable to both CAPD and APD patients [20]. IPD involves three key criteria: initiating PD with

Table 2: Possible benefits and drawbacks of IPD [20, 52, 56, 61, 63, 75].

Benefits
- Preservation of RKF
- Reduced risk of peritonitis
- Preservation of peritoneal membrane
- Reduced systemic complications of glucose exposure
- Reduced environmental impact
- Reduced healthcare costs
- Improved QoL
- Improved participation in life
Drawbacks
- Decreased small solute clearance
- Increased risk of fluid overload
- Risk of therapeutic inertia
- Refusal of patients to increase PD dose
- Reduced patient survival if dialysis dose is not adequate

RKF, Residual Kidney Function; QoL, Quality of life; PD, Peritoneal Dialysis.

a lower dose than the standard “full dose,” acknowledging the value of RKF, setting initial peritoneal clearance below personalized targets but combining it with renal clearance to reach the target, and having a clear plan to increase the PD dose if necessary [13, 20, 56, 57]. IPD differs from traditional PD prescriptions, with CAPD involving fewer daily dwells per week, sometimes even a single icodextrin exchange. In APD, “full-dose” requires minimum daily volumes, while incremental APD involves fewer daily dwells per week. The flexibility of IPD allows for variations in fill volumes, exchanges and “dry” days [56, 58–63]. This personalized approach helps patients and families adapt and has the potential to enhance their QoL by reducing the treatment burden and time requirements [14, 20, 47, 63]. IPD also offers economic benefits, requiring less PD solution and potentially reducing peritoneal glucose exposure, which can preserve the peritoneal membrane and reduce metabolic complications [59, 61]. Moreover, it may have environmental advantages by using fewer bags and could lower the risk of peritonitis due to fewer connections. However, these benefits should be carefully considered alongside potential drawbacks (Table 2), primarily related to the lower dialysis dose in IPD, which could affect patient survival, particularly related to small solute clearance and fluid removal [56, 58–63]. The appeal of IPD lies in its personalized approach, making the initiation of therapy more comfortable for patients and promoting higher PD use rates. However, its success depends on patient preferences, adequate education and active engagement in shared decision-making with healthcare teams [13]. Careful monitoring is essential to prevent complications related to under dialysis, thus proper education can address patient reluctance to increase doses. The lack of standardized criteria for IPD prescription and varying study parameters make it challenging to achieve consistent results [56, 58–63].

Elderly and frail patients

When prescribing high-quality, person-centered PD, a challenge lies in identifying individuals who would benefit from increased dialysis or changes in modality to improve outcomes [13–15]. However, it is crucial to acknowledge that some patients might be hesitant due to potential impacts on their well-being and QoL while on dialysis [13] (Table 3). For certain individuals, like the elderly, frail or those with a poor prognosis, reducing the dialysis

Table 3: Person-centered PD delivery prescription; individualized care (adapted from ISPD practice recommendations for prescribing high-quality goal-directed peritoneal dialysis) [1].

(i) Factors that may support an increase in dialysis dose

- ✓ Young individuals with long life expectancy would benefit from an increase in dialysis prescription or change in dialysis modality
- ✓ Patients with symptoms associated to uremic symptoms, such as increasing tiredness, appetite loss, nausea, weight loss (recognizing there could be other causes of individual symptoms)
- ✓ Patients with symptomatic volume overload
- ✓ Patients with poor nutritional status or clinical features of protein-energy wasting
- ✓ Decline in urine volume and/or renal small solute removal
- ✓ Biochemical features such as: hyperkalemia, hyperphosphatemia and low plasma bicarbonate

(ii) Factors that may justify not changing the dialysis prescription even though the patient may not fulfill the former guideline recommendations focused mainly on biochemical or ultrafiltration targets

- ✓ For some individuals, particularly those who are old, frail or have a poor prognosis, there may be a QoL benefit from a modified dialysis prescription to minimize the burden of treatment

QoL, Quality of life.

prescription to minimize treatment burden could improve their QoL [13, 14, 64]. In these cases, person-centered care and shared decision-making are vital to tailor the dialysis approach to the patient's specific needs and preferences [13–15, 64]. Managing elderly and frail patients with ESKD remains a challenge, where a shared decision-making process involving patients, families and medical staff is essential [64]. Elderly patients with ESKD who undergo PD often display frailty, and some may require palliative care due to their poor prognosis. Tailoring a dialysis prescription to the specific needs of these patients, focusing on symptom control and maintaining QoL, can help minimize their treatment burden [13, 15, 64, 65]. The process begins with a screening to identify those patients who would benefit most from this approach to PD prescription [14, 64]. Some frail patients who choose PD may require palliative care and wish to continue dialysis treatment until the end of their life.

Palliative dialysis is an approach that offers early recognition and treatment of symptoms and psychosocial issues, ultimately improving the QoL of patients and their families [66]. It is proposed that traditional therapeutic targets should be substituted by goals focused on relieving symptoms [66]. Decision-making becomes complex for these patients, where anticipated benefits must be weighed against the physical risks and psychosocial toll of therapy [15]. Customizing dialysis prescriptions for these patients, focusing on symptom control and QoL, can alleviate treatment burden. Shifting from traditional goals to symptom relief is suggested, with assisted PD as an option, avoiding HD transfer and reducing caregiver load [64, 67, 68].

Transition from PD to HD

When providing a high quality, person-centered and goal-directed PD approach, we cannot forget that, sometimes, patients will need a change in dialysis modality in order to optimize their well-being and lifestyle, as well as patient outcomes [13]. Changing between different dialysis modalities is key for managing ESKD patients as their needs and goals evolve over time. Since most patients may require several modality changes during their RRT journey, optimizing treatment pathways becomes essential [22, 23]. This requires continuous assessment and involves offering the most suitable RRT modality for their individual situation, while considering potential future needs, ensuring that patients receive the right RRT, at the right time, promoting the best QoL and best possible outcomes [22]. During transition, the shared decision-making process plays a vital role, addressing not only present needs but also anticipating and

accommodating future changes [15]. Maintaining transparent communication with patients about the reasons for the transition is crucial, addressing their experiences and concerns [15, 67]. This involves engaging with patients to understand their preferences and goals and facilitating their comprehension of the necessity for changes, especially when transition becomes necessary to optimize outcomes and prolong survival [20].

When focusing on the transition from PD to another treatment option, although the primary goal is usually kidney transplantation, this may not be feasible for all patients. In such cases, when patients experience PD completion, they usually switch to facility-based HD [22, 29, 55]. However, it is important to recognize the value of another home dialysis option—HHD. This transition enables patients who are already accustomed to a home modality to maintain their independence, QoL and well-being, while taking advantage of the long-term benefits of HHD, resulting in excellent clinical outcomes [22, 26, 67, 69–71]. The transition rate from PD to HHD is currently low [72], with very diverse barriers requiring a multifaceted approach [26, 67, 72]. PD patients face multiple challenges, with an increased frailty during this transition period adding another layer of difficulty [72]. The focus should be on individual patient goals and preferences when planning for timely and appropriate transition, aiming to minimize discomfort and anxiety for patients [22]. To optimize this transition, several key considerations have the potential to enhance the overall process. These include ensuring comprehensive training for healthcare professionals [72] and introducing the concept of transition early on, encouraging patients to perceive it as an integral aspect of their therapy rather than a treatment failure [22, 26, 73, 74]. Implementing a patient management model that emphasizes a robust connection with home dialysis nursing and integrates flexible HHD training programs is crucial [72]. Additionally, promoting the consideration of HHD as part of a comprehensive integrated home dialysis model is also essential [25, 26]. All these strategies should concentrate on integrating home dialysis care (HHD and PD) to ensure a consistent level of experience and comfort across all home dialysis modalities [67], in order to provide the best health outcome possible for a person living with kidney disease [17, 19, 67].

CONCLUSIONS

This new understanding of PD adequacy shifts the physician's approach to treatment, prioritizing individualized patient care beyond just urea or fluid removal. Patient symptoms and preferences become central in determining dialysis prescriptions and

modifications. Customizing treatments and exploring modality options fosters a holistic approach to kidney replacement therapy, encompassing incremental PD, palliative care and even transitioning between modalities. To effectively implement this approach, a well-conducted shared decision-making process is crucial, that ensures alignment between patient values and quality standards. Maintaining a balance between patient preferences, delivery of high-quality treatment and management of treatment burden is essential to preserve patient well-being while achieving optimal outcomes.

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