

Dialysis in the elderly patient: a challenge of the XXI century - narrative review

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ABSTRACT

With the increase in life expectancy, the improvement of therapeutic arsenal, knowledge and control of chronic degenerative diseases, the world population has reached older age groups. As advanced age is a risk factor for chronic kidney disease (CKD), along with the bonus of increased survival, today we are experiencing the greatest burden of progressive incidence of elderly patients on renal replacement therapy (RRT). Dialysis in elderly patients, which for three decades was considered out of question, today is a routine for nephrologists, who face the challenge of providing care to elderly patients with CKD stage 5 with dialysis indication. In fact, what we see nowadays are dialysis incidents elderly patients as the fastest growing group on RRT. Although without reaching a consensus, it seems indisputable that for elderly patients with CKD, the most important is the quality of life. In this paper we discuss the dialysis in the elderly patient.

Keywords: frail elderly; kidney failure, chronic; peritoneal dialysis; renal dialysis.

INTRODUCTION

The world's population is aging, and in Brazil the situation is not different. Life expectancy in the country increased by 25.4 years - from 48 to 73.4 - between 1960 and 2010.¹ The World Health Organization has defined the elderly

population in developing countries as the group of individuals aged 60 years and above.² It is believed that by 2025 Brazil's elderly population will rank sixth in the world, with 32 million people aged 60 and above.¹

With aging, non-communicable diseases such as hypertension (HTN) and diabetes mellitus (DM) have become more prevalent. Consequently, the demand for renal replacement therapy (RRT) has grown among elderly patients, as HTN and DM are the leading causes of chronic kidney disease (CKD) in our practice. On the other hand, the advances in the management of other diseases associated with this population, such as cardiovascular diseases and tumors, have increased patient survival and allowed them to reach stage 5 of chronic kidney disease.³

These factors have turned this particular group of patients into the largest and fastest growing age group on dialysis.⁴

Thirty years ago, patients above the age of 60 were not offered dialysis. But things have changed. And some facts explain such change: increased demand from elderly patients, agreement in industrialized countries over the need to offer dialysis to elderly patients, and improved survival of aging patients on dialysis.⁵

One in four patients starting RRT in the USA is aged 75 or older.⁶ Along the same trend, in France the mean age

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of patients on dialysis is 70.2 years⁷ and in the UK it is around 65.⁸ In our practice, the 2011 census of the Brazilian Nephrology Association revealed that 31.5% of the patients on RRT were 65 or older, an increase of 0.8% in relation to the previous year.⁹

A recent paper¹⁰ on dialysis for elderly patients showed that there is no consensus on the best course of therapy for this age group, given that survival rates of subjects on peritoneal dialysis (PD) or hemodialysis (HD) are similar. In fact, depending on the situation, there is doubt as to whether it is worthwhile offering dialysis at all.¹¹ This paper looked into dialysis offered to elderly patients.

GERIATRIC PATIENT APPROACH

As predicted by Oreopoulos & Dimkovic, nephrologists in the 21st century will have to practice geriatrics as amateur geriatricians.¹² To nephrologists, seeing elderly patients is always a dilemma, as these subjects require geriatric care measures that are not included in the formal training of nephrology.

The difficulties inherent to dealing with these patients stem from the complexity of the conditions they have, the need to offer interdisciplinary care, the assessment of their functional status, and the observation of quality of life in the development of the therapeutic approach. Broad multidimensional interdisciplinary geriatric assessment is therefore required in order to establish the deficiencies, incapacities, and handicaps presented by elderly patients and properly plan for their care and long-term follow-up.¹³

Table 1 lists common geriatric conditions that impact renal therapies.¹⁴

It is important to realize that the purpose of successful geriatric follow-up is to keep elderly

subjects independent and with preserved functional capacity for as long as possible.

THE KIDNEY OF THE ELDERLY

The prevalence of chronic diseases such as DM and HTN and the incidence and complexity of advanced chronic kidney disease is higher in elderly individuals. Progressive decrease of renal reserve secondary to anatomic and functional alterations in the kidneys are also observed with the aging of the population. Alterations include reductions in the size and weight of the kidneys and decreased renal blood flow, glomerular filtration rate (GFR) and tubular function.¹⁵

GFR decreases gradually with time, but such decline is accompanied by gradual loss of muscle tissue (sarcopenia) and consequently lower creatinine levels, thus artificially boosting up glomerular filtration rates.¹⁶ Therefore, renal function deterioration may not result in increased serum creatinine. Equations such as the ones proposed by Cockcroft & Gault¹⁷ or the Modification of Diet in Renal Disease (MDRD) Study Group¹⁸ are thus needed to calculate glomerular filtration rates. The Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) equation¹⁹ is more accurate and overcomes some of the constraints of the MDRD formula, but there is no consensus over which of the two is better for this age range.^{20,21}

Additionally, the approach for the diagnosis and treatment of certain conditions such as HTN, DM, glomerular disease, and cardiovascular disease may be significantly different for elderly subjects when compared to young patients,²² as shown in Table 2.

CONSERVATIVE TREATMENT

In daily medical practice, when dialysis is prescribed for patients with stage 5 CKD, the question

TABLE 1 GERIATRIC CONDITIONS THAT AFFECT NEPHROLOGY CARE (ADAPTED FROM WIGGINS, 2009)¹⁴

Visual impairment	Polypharmacy	Functional limitations
Auditory impairment	Emotional problems	Lack of social support
Malnutrition / weight loss	Urinary incontinence	Financial difficulties
Cognitive involvement	Balance and gait impairment/falls	Home environment/safety

TABLE 2 CHARACTERISTICS OF ELDERLY SUBJECTS BEFORE CERTAIN DISEASES (ADAPTED FROM ROSNER, ABDEL-RAHMAN, WILLIAMS, 2010)²²

Disease	Elderly subject characteristics	Recommendations
Diabetes		
a) Glucose level management	Little benefit from intensive glucose level management; more prone to hypoglycemia; increased risk of drug-associated hypoglycemia. ²³	Control glucose levels and assess risk/benefit of reaching Hgb A1C < 7.0.
b) Antihypertensives	Increased risk of significant BP decrease; ²⁴ look at few advantages and side effects of ACEi/ARBs. ²⁵	Avoid significantly low BP; be careful when prescribing ACEi/ARBs.
Hypertension		
a) Goal	CV events, cognitive impairment, incapacity, and death may be greater risk factor for elderly patients than progression to kidney disease. ²⁶	Consider other outcomes as goal to manage BP in addition to delaying renal function progression.
b) Specific drug	ACEi/ARBs may cause AKI and hypercalcemia, with higher incidence in elderly subjects. ²⁷	Need to perform more lab tests after start of ACEi/ARBs; diet changes; chronic administration of ion exchange resins may be needed; limit use of drugs that increase potassium levels.
Glomerulonephritis	Albuminuria increases with age; ²⁸ elderly with proteinuria are at significant risk of function loss in 5 years; ²⁹ albuminuria is associated with increased risk of dementia, HTN, and CVD; ²⁹ clinical manifestations of glomerular diseases are scarce in elderly patients.	Is the meaning of albuminuria different in elderly patients than in young subjects? Consider more biopsies in this group and risks/benefits of using immunosuppressants aggressively.
Heart disease	Diagnose acute coronary syndrome in elderly CKD patients may be challenging, as non-invasive tests have varying sensitivities and specificities, ³⁰ clinical presentation is uncommon ³¹ and interpretation of standard lab markers is difficult. ³²	Be careful when doing the workup for acute coronary syndrome in elderly individuals.
Vascular disease	Increased incidence of renal artery stenosis. ³³ Response to carotid baroreflex is usually attenuated and vasodilating antihypertensives may introduce dizziness and postural hypotension.	Markers required to predict benefit from interventions for renal vascular disease; caution when using ACEi and ARBs
Anemia	High prevalence of anemia. ³⁴	Consider target for Hgb levels, specially if the patient has history of vascular disease, pro-thrombotic conditions such as tumors, or poorly controlled BP.
Nutritional status	The body mass index is not adequate to assess nutritional status because of changes in body composition. ³⁵	Address malnutrition early on, as it is a marker for death. ³⁶ The impact of obesity is controversial. ³⁶
Mineral and bone disorder	Osteoporosis and osteoporotic fractures are prevalent. ³⁷ Age is a risk factor for adynamic bone disease. ³⁸	Observe calcium in dialysate and assess bone mineral density. ³⁸

one should ask is whether the patient will truly benefit from the treatment. Although age *per se* is not an impediment to putting older patients on dialysis, other aspects should be analyzed at the time of treatment prescription. Life expectancy,^{39,40} the impact of dialysis on patient quality of life,³⁹ survival determining factors,⁴⁰ the impact of comorbidities and treatment costs³⁹ must be considered

in the thought process. Interestingly, 78% of the elderly population has at least one chronic disease and 30% has more than three.⁴¹

A recent study carried out in Belgium found that octogenarians with stage 4 CKD were more prone to dying of an associated comorbidity than to need dialysis.⁴² According to some authors, non-dialysis treatments are more adequate in

these cases, as dialysis may be a deterrent to attaining good quality of life in patients with severe comorbidities.¹¹

Thus, patients with stage 5 CKD unwilling to undergo dialysis have been offered other types of care described as conservative treatment, maximum conservative treatment (MCM), non-dialysis treatment, and renal palliative care.¹¹ Non-dialysis treatment is also an important therapeutic option.⁴³ This approach focuses in strictly controlling anemia, acidosis, fluid overload, blood pressure, insomnia, fatigue, anorexia, pain, depression and other symptoms associated with stage 5 CKD.⁴⁴

When dialysis is considered for elderly patients with multiple comorbidities, no significant differences have been described between dialysis and MCM.⁴⁵ A study by Carson *et al.* looked into a cohort of 202 elderly patients treated with MCM or RRT and compared their outcomes. The authors reported that patients with multiple comorbidities had their survival prolonged for about two years with dialysis, whereas subjects on MCM survived for a significant period of time with a number of off-hospital days similar to that of patients on HD.¹¹ It should also be noted that patients aged 80 years or older lose some of their independence when they start dialysis.⁴⁶ This is probably due to frequent hospitalization, time spent in dialysis sessions (as an obstacle to socialization), and post-treatment exhaustion (fatigue, dizziness, cramps). And that is why MCM is a possible option for these patients.⁴⁷ A recently published systematic review showed that conservative treatment is a viable option and that not offering dialysis is completely different from suspending dialysis when death is imminent.⁴⁸

In addition to its significant cost, dialysis affects the functional status, quality of life, and life expectancy of geriatric patients.

The growing number of geriatric patients on dialysis calls for changes in medical care. Instead of extending one's life through dialysis, preference should be given to providing symptom relief and palliative care. Research has shown that most elderly patients would pick dialysis if offered, although for them symptom relief has precedence over prolonging life.⁴⁹

Dialysis may introduce cognitive impairment and affect the lives of patients and their caregivers.^{46,50} Additionally, the high mortality rates observed within the first 90 days of dialysis, along with the significant morbidities experienced by survivors, do not compensate the benefits yielded by the treatment. All these factors speak favorably of conservative management.⁵¹ Conservative treatment has become an option for patients with multiple comorbidities and slow renal function decrease,⁴⁵ as many individuals with advanced CKD enjoy stable kidney function for years and renal function decreases may vary inversely with age.¹⁶

Early care offered by a nephrologist allows chronic geriatric patients with stage 5 CKD to have time to understand their condition and decide whether they wish to proceed with dialysis.⁵² At any rate, physicians need to be aware of the fact that it is their responsibility to offer therapies to improve quality of life, instead of only prolonging life.

THE CHOICE OF DIALYSIS

Age is an independent factor for risk of late referral. Xue *et al.* showed that the time elapsed between the moment the patient was referred to a nephrologist and the start of dialysis was 3.5 weeks for individuals aged 75 or older, and 20.5 weeks for subjects under 75 years of age.⁵² Early referral is not only associated to reduced mortality in the beginning of dialysis,⁵³ but it also provides patients with time to understand the modes of dialysis, make their choice, and plan for the start of therapy without having to rush. This leads to increased compliance to therapy, a factor correlated with improved quality of life.⁵⁴

The medical and social contexts, along with geographic considerations and patient preferences, dictate the choice for PD (continuous ambulatory peritoneal dialysis -CAPD; automatic peritoneal dialysis -APD) or HD, with patient preferences taking precedence over the other factors. Although seldom provided, patient education plays a key role in the choice of therapy.⁵⁴

Table 3 lists some of the characteristics of both methods.

TABLE 3 ADVANTAGES AND DISADVANTAGES OF HD AND PD (ADAPTED FROM DIMKOVIC & OREOPOULOS, 2009)⁵⁵

	Hemodialysis	Peritoneal dialysis
Advantages	Performed by nursing staff	Performed at home
	Short course of treatment	Improved BP control
	Patient socialization	Access simplicity
	Possible for most	Preservation of renal function
	Ongoing medical follow-up	Greater patient commitment
	Long-term data available	Greater cardiovascular stability
	Adequacy control	Easy to travel
Disadvantages		Can be performed by family member
	More problems with vascular access	Steeper learning curve
	More use of central lines	Not possible for all
	Increased risk of septicemia	Social isolation
	Increased risk of hypotension	Peritonitis
	Transport for HD unit	Less anemia

PERITONEAL DIALYSIS

PD has been underused⁵⁶ for many reasons, ranging from financial to cultural issues, limited availability and lack of familiarity treating elderly patients, thus reinforcing a self-perpetuating cycle.⁵⁶ A recent study carried out with nephrologists revealed that 25%-30% of the patients could be optimally managed with PD, a number much higher than what has been observed in clinical practice.⁵⁷

A study showed that, in the absence of contraindications, a third of the elderly patients chose PD before HD.⁵⁸ Absolute contraindications⁵⁹ to peritoneal dialysis are inadequate peritoneal membrane (peritoneal sclerosis, extensive surgical resection), abdominal cavity incompetence (peritoneal compartmentalization, peritoneal-pleural communication), high risk of abdominal infection (recurrent diverticulitis, and active inflammatory bowel disease). Controversial contraindications include polycystic kidney disease, morbid obesity, diverticulitis, chronic obstructive pulmonary disease, osotomy, and repaired recurrent hernia.⁵⁹

It is important to realize that, in addition to clinical contraindications, elderly patients tend to face more obstacles while caring for themselves at home, which may lead the false belief that home PD is not a viable choice for these patients.⁶⁰ These barriers may be physical (decreased eyesight, strength, manual dexterity, or mobility) cognitive (dementia, psychiatric conditions, or learning disorders), social (no fixed residence, unhealthy

or unsafe residence) or psychological (fear of lack of supervision, fear of isolation at home, feeling of helplessness before the possibility of having to undergo dialysis at home).⁶¹ A multidisciplinary approach is of great use in identifying the possible obstacles preventing patients from undergoing PD and in helping them overcome these barriers.⁶¹

Although many nephrologists believe that home dialysis is contraindicated to most chronic renal patients,⁶² studies have shown that over 70% of the patients starting RRT were good candidates for PD, against 95% for HD.⁶³ Interestingly, patients with CKD submitted to early assessment by a nephrologist are more prone to starting treatment using PD. Indeed, with proper education more patients prefer home care.⁶⁴

Data from the USRDS showed that 12% of the patients aged between 20 and 55 years and only 4% of the patients aged 75 or older are on PD.⁶⁰ The opposite is seen in France, where more than half of the patients aged 70 or older are on PD. Hong-Kong uses a 'PD first' policy, in which elderly patients have been successfully managed with PD. In March of 2007, 80% of the patients treated in Hong-Kong had a mean age of 62.3 years.⁶⁵ In the UK and Canada, 17% and 12% of the geriatric patients are on PD, respectively.⁶⁶ The BRAZPD trial looked into 3,226 patients on PD (48% of the total number of patients on PD in Brazil) and revealed that 37% of them were aged 65 years or older.⁶⁷

Analysis has shown that PD appears to be better tolerated by elderly patients for a number of reasons: treatment is done at home, they do not have to travel three times a week to the dialysis center, no hemodynamic variations occur during PD,⁶⁸ and no vascular access is required, thus decreasing the possibility of infection and hospitalization. In regards to PD, the initial concern with higher risk of peritonitis in elderly patients was not verified in large cohort studies.⁶⁹

Assisted dialysis methods (continuous ambulatory peritoneal dialysis -CAPD; assisted automated peritoneal dialysis -AAPD) were developed in Europe for patients unable to care for themselves. In assisted dialysis programs, trained nurses visit patients in their homes to collect peritoneal effluent,^{70,71} change dialysis bags, treat catheter outlet wounds, and examine patients for BP and weight, in addition to connecting and disconnecting the cyclor machine for patients on APD.⁶¹ Povlsen & Ivarsen⁷¹ and Brazilian authors have described AAPD as a viable and safe option for renal replacement therapy in frail patients and physically handicapped subjects.⁷²

Therefore, elderly patients with multiple comorbidities, physically or mentally unable to care for themselves, have in assisted PD an adequate treatment option that provides good quality of life and improved survival.^{71,73}

HEMODIALYSIS

Most elderly patients starting dialysis choose HD. Cohen *et al.* developed a method to predict the outcomes of elderly patients starting HD based on five variables (advanced age, dementia, peripheral vascular disease, hypoalbuminemia, and negative answer to the question 'would you be surprised if this patient died next year?'). This method can help physicians and patient family members decide which treatment to choose.⁷⁴

The vascular access is one of the concerns when HD is considered for elderly patients, given its association with death in patients with end-stage renal disease.⁷⁵ Central venous catheter infection is the most feared adverse event in patients on dialysis.⁴⁹ Vascular access, whether in the form of AV fistulas or grafts, is always troublesome,

as atherosclerosis and previous vascular injury may increase the patient's risk of distal ischemia. Besides, the maturation of the AV fistula may take longer than the time for which patients are expected to survive, thus limiting the benefits of AV fistulas to a specific group of individuals.⁷⁶ Despite the lack of randomized trials on the matter, a study revealed that AV fistulas were associated with lower mortality rates in patients aged 67 or older when compared to grafts and catheters.⁷⁷

Therefore, today 'fistula first' is the main recommendation for all patients on HD.⁷⁸ As far as location goes, some authors have shown that distal fistulas (radiocephalic vs. brachiocephalic) have lower success rates in elderly patients (patency in one year of 66% vs. 81%, respectively); arm AV fistulas have been considered as a option.⁷⁹

Regardless of the difficulties inherent to vascular accesses, elderly patients on HD are subject to the same complications as younger patients, though more frequently.⁶¹ The most important adverse events are intradialytic hypotension, malnutrition, infection, gastrointestinal bleeding, and, more frequently, interruption of dialysis.⁸⁰

A particularly interesting recently published paper reported drops in residual urinary output as the main risk factor for death in elderly patients on HD.⁸¹ The paper published by Cornelis *et al.* suggested that intensive dialysis with nocturnal or short daily course HD may improve the outcomes of elderly patients,⁸² given that frail patients may not tolerate the abrupt hemodynamic changes inherent to conventional HD.⁴⁷ Despite the lack of studies to formally support the adoption of this therapy as the ideal choice for elderly subjects, intensive HD appears as an interesting option to reduce hypotension related to dialysis, protect patients against cerebral and cardiovascular events, and decrease the incidence of infection, malnutrition, sleep disorders, and psychological complications observed in the beginning of dialysis.

QUALITY OF LIFE AND SURVIVAL

A study revealed that for very old patients with CKD the chances of dying were greater than the chances of undergoing dialysis.⁸³ It should be noted that chronological age is not as relevant as the

patient's clinical status. Comorbidities such as cardiovascular diseases have much greater impact on survival.⁴⁷

In terms of patient survival, PD and HD appear to have similar outcomes. PD still produces shorter survival, but outcomes have improved strikingly with less peritoneal infection, making mean survivals of five years or more a reality for patients.⁵⁹ It is important to consider that survival, regardless of method, is significantly affected by late referral to nephrology care, major comorbidities, and patient functional status.^{3,40}

A multicenter trial with 140 patients on PD or HD aged 65 or older reported that quality of life was similar, if not better, for patients on PD when compared against similar demographic groups.⁸⁴ Two longitudinal studies looking at this matter assessed the quality of life of elderly patients. The North Thames Dialysis Study did not describe differences between PD and HD in regards to survival or quality of life in patients aged 70 years or older.³⁹ The Broadening Options for Long-Term Dialysis in the Elderly (BOLDE) study did not report differences in the quality of life of elderly patients treated with PD or HD.⁸⁴ Unruh *et al.*⁸⁵ and the two studies mentioned above suggested that the main reasons for low quality-of-life scores were changes in the physical well-being of elderly subjects, with much lesser impact from mental health scores.

CONCLUSION

The aging of the population has diverted more attention to the health of elderly individuals and the preservation of their autonomy and independence. The lack of a clear winner among the therapies available for elderly patients with stage 5 CKD has increased the relevance of broad geriatric assessment in the indication of dialysis. The three treatment options - PD, HD, and conservative management - have specific use and application. Treatment must be individualized and consider first the patient's wishes. Regardless of the chosen mode of dialysis, prescription must be based on the chances of prolonging patient survival while preserving quality of life.

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Volume 35 Issue 2 - Apr/Jun 2012**DIALYSIS IN THE ELDERLY PATIENT: A CHALLENGE OF THE XXI CENTURY - NARRATIVE REVIEW**

DIÁLISE NO PACIENTE IDOSO: UM DESAFIO DO SÉCULO XXI - REVISÃO NARRATIVA

Marcia Regina Gianotti Franco, Natália Maria da Silva Fernandes

On Page 138, the paragraph below:

Therefore, today 'fistula first' is the main recommendation for all patients on HD.⁷⁸ As far as location goes, some authors have shown that the most distal (radiocephalic), when compared to the brachiocephalic, have lower success rates in elderly patients (one year patency of 81% vs. 66%, respectively); AV fistulas in the arm have been considered.⁷⁹

Should read:

Therefore, today 'fistula first' is the main recommendation for all patients on HD.⁷⁸ As far as location goes, some authors have shown that the most distal (radiocephalic), when compared to the brachiocephalic, have lower success rates in elderly patients (one year patency of 66% vs. 81%, respectively); AV fistulas in the arm have been considered.⁷⁹