Chronic kidney disease and its treatment in the elderly: an integrative review

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Abstract

Population aging, along with the increasing incidence of chronic diseases, has contributed to a global rise in the prevalence of chronic kidney disease (CKD). The aim of this study was to perform an integrative review of proposed treatments for elderly patients with non-dialysis phase CKD. A literature search was performed of studies written from January 2002 to May 2013, registered on the MEDLINE, LILACS, SciELO and Science Direct electronic databases, using the keywords: chronic kidney disease, treatment and elderly. Complete, freely available articles were included. Initially, 215 items were identified. After the eligibility phase, 13 articles were included in this integrative review. The therapeutic interventions recommended for the management of CKD include the control of hypertension, diabetes and dyslipidemia, changes to diet, weight reduction and abstinence from smoking. In terms of treatment, for many older people with CKD, an individualized patient-centered approach may be more effective than the traditional disease-oriented strategy. Referral to a nephrologist appears to be a beneficial procedure for the management of renal disease. While there was an apparent effort by researchers to institute more effective therapeutic approaches, there was little evidence of interventions that might improve survival rates of elderly patients with CKD. However, some interventions prevent exacerbation of the disease, and delay the progression of CKD. There is therefore a need to conduct long-term randomized controlled trials of elderly patients with CKD in order to identify the most effective therapeutic procedures for the control of this disease.

Key words: Renal Insufficiency, Chronic. Disease, Chronic Kidney. Aging. Therapeutics.

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INTRODUCTION

Chronic Kidney Disease (CKD) is defined as an abnormality in renal structure or function which is present for a period of three months or longer and has resultant implications for health, with glomerular filtration rate (GFR) and albuminuria being used to define the stages of the illness.[1] (Table 1)

Table 1. Classification of chronic kidney disease (CKD), categorized by glomerular filtration rate (GFR) and albuminuria. São Paulo, SP, 2013.

Category	GFR (mL/min/1.73 m^2)	Albumin excretion rate (mg/24 hours)	Albumin/creatinine ratio (mg/g)	Description
GFR				
G1	≥90	-	-	Normal or high
G2	60-89	-	-	Slightly reduced*†
G3a	45-59	-	-	Mildly or moderately reduced
G3b	30-44	-	-	Moderately to severely reduced
G4	15-29	-	-	Severely reduced
G5	<15	-	-	Kidney failure
Albuminuria				
A1	-	<30	<30	Normal to slightly increased
A2	-	30-300	30-300	Moderately increased*
A3	-	>300	>300	Severely increased‡

Adapted from references 1 and 6; *in relation to the level of young adults; †in the absence of evidence of kidney damage, the G1 and G2 GFR categories do not meet the criteria for DRC; ‡including nephrotic syndrome (albumin excretion rate generally> 2200mg/24 hours; albumin/creatinine ratio> 2220 mg/g).

Population aging and an increasing incidence of diabetes, arterial hypertension and other illnesses and non-communicable diseases have contributed to a global increase in the prevalence of CKD and end-stage renal disease (ESRD),[2,3] leading to its recognition as a public health problem.[4,5] While it is debatable whether a decrease in GFR or an increase in the albumin/creatinine ratio amongst the elderly is indicative of the disease or simply part of the "normal ageing process", it is worth remembering that ageing is associated with a build-up of comorbidities and increased medication use, which may lead to a reduction in incidence of GFR and albuminuria.[6]

Strategies for the early identification and treatment of individuals with CKD, who are at risk of cardiovascular events and of progression to the terminal phase of the disease, are required the world over, especially in countries where renal replacement therapy is not readily available.[2] In addition, strategies are needed for the prevention,

early detection and treatment of complications related to CKD, in order to prolong survival and improve quality of life for patients.[7]

Considering that the over 60s are the fastest growing segment of the global population, with numbers set to increase from 841 million in 2013 to a projected two billion in 2050,[8] and that early diagnosis and therapeutic interventions in the early stages of CKD may have a favorable impact on patients with renal dysfunction,[9] awareness of proposed strategies for the treatment of the disease is becoming increasingly important.

The aim of this study, therefore, was to verify the proposed treatments for elderly patients suffering from chronic kidney disease in the non-dialysis phase by means of an integrative review.

METHOD

A survey was performed of studies of CKD and its treatment among the elderly, including complete and freely available articles in Portuguese, English and Spanish. The survey included the MEDLINE (National Library of Medicine), LILACS (Literatura Latino-americana e do Caribe em Ciências da Saúde (Latin American and Caribbean Health Sciences Literature, in English)), SciELO (Scientific Electronic Library Online) and Science Direct data bases, using the key-words: *chronic kidney disease*, *treatment* and *elderly*, in English only, present in the abstracts, key-words or titles of the articles.

Studies published between January 2002 and May 2013 were selected for the review, subject to the following inclusion criteria: publication date, a freely available and complete text, in Portuguese, English or Spanish, with participants aged over 60 and a thematic focus on conservative or non-dialysis stage treatment of CKD.

The summaries of all the articles selected through their keywords were read in full, and those that did not meet the established criteria were excluded from the study, as were works that were repeated across different databases.

An initial survey of the MEDLINE, LILACS, SciELO and Science Direct databases found 215 articles. After the removal of duplicates from within each database, 208 studies remained. In the next stage, articles that were duplicated across the databases were excluded, leaving 182 studies. After the eligibility stage, which considered the language of articles, whether or not they were full-texts and the age of the participants, 178 studies were left. Works not investigating the conservative treatment of CKD or that were incomplete also were excluded. Finally, a total of 13 scientific articles were selected from literature reviews and research reports. (Figure 1).

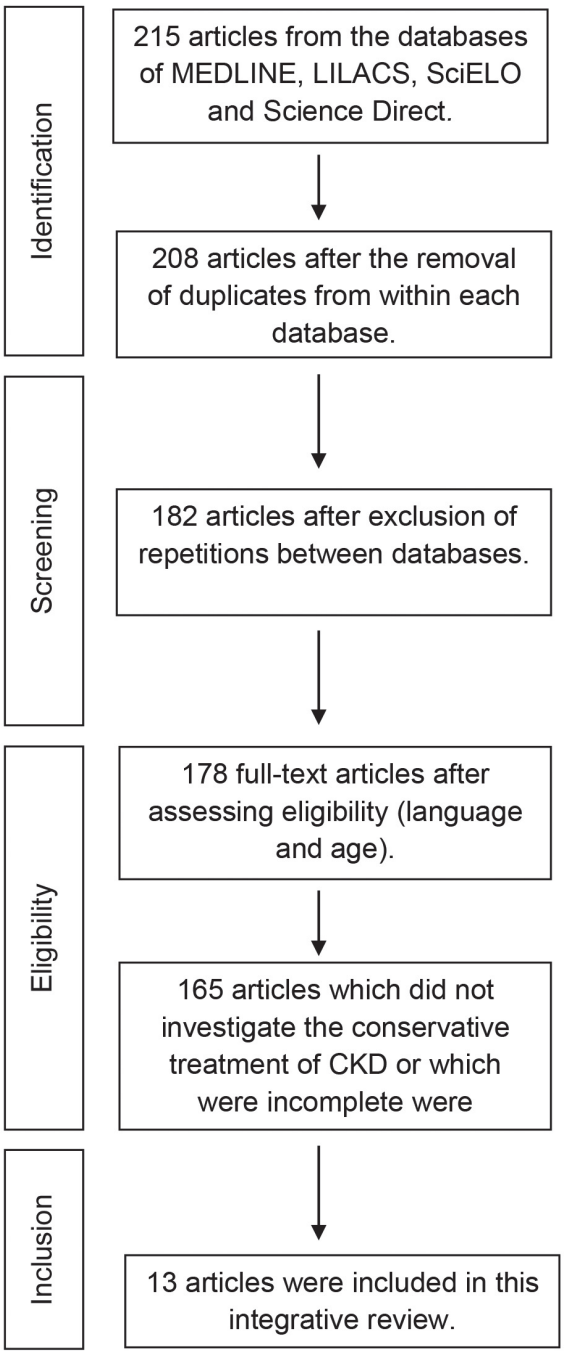

Figure 1. Scheme for selection of the articles found in the different databases. São Paulo, SP, 2013.

After selection of articles that met the inclusion criteria, the studies were read in full in order to extract, organize and summarize the available information. On the basis of the information gathered, a descriptive analysis of the results was performed, enabling interpretation and discussion of the findings. These stages allowed the development of a synthesis of the knowledge presented, as well as a presentation of the available evidence regarding the proposed recommendations for the treatment of elderly persons suffering from non-dialytic stage CKD.

The information obtained from analysis of the articles was organized into: 1) therapeutic interventions proposed for the management of CKD; 2) approaches to treatment; and 3) referral to a nephrologist.

RESULTS

Therapeutic Interventions

The treatment objectives of all patients with CKD, regardless of the cause, include the prevention of cardiovascular events[2] and a reduction in the rate of progression of the disease, slowing or preventing ESRD and other complications,[2,9] such as anemia, mineral bone disorder and metabolic acidosis.[1]

Amongst therapeutic interventions, those which are most prevalent in the literature involve the control of arterial hypertension, [2-4,7,9-12] diabetes[2,11,12] and dyslipidemia,[2,7,11-13] dietary changes,[2,11,12,14] weight loss and abstinence from smoking.[2,12]

Control of arterial hypertension

Treatment of arterial hypertension is considered a base for managing and delaying the progression of CKD[2-4,11,12] and reducing cardiovascular risk. [2,3,11]

The studies show that first-line treatment for the control of arterial hypertension in CKD patients consists of the use of antihypertensive agents that inhibit the renin-angiotensin system, such as angiotensin converting enzyme (ACE) inhibitors and angiotensin receptor blockers (ARB).[2-4,7,9-12]

Although ACE inhibitors are agents used to slow the progression of kidney disease, the majority of studies address this function in non-diabetic, chronic renal patients. The efficacy of the therapy was more clearly shown in patients with proteinuric CKD, and the treatment is recommended as a first-line treatment for this subgroup. The inhibition of angiotensin converting enzymes has clear renal benefits for patients with diabetic nephropathy and decreases the risk of death, dialysis or transplant in individuals with type 1 diabetes and established nephropathy.[2]

The effects of ARBs on the progression of CKD in non-diabetic patients have been studied less than those of ACE inhibitors. ARBs are antihypertensive drugs, effective for patients with CKD, and reduce proteinuria to similar levels to those achieved by ACE inhibitors.[2] Therefore, both ACE inhibitors and ARBs may be used to slow CKD progression in patients with early nephropathy, as they possess similar eficacy.[12]

Treatment using a combination of ACEI and ARB appears to be a viable option, capable of providing additional renoprotection,[2.12] as well as ameliorating cardiovascular events.[3] However, it is necessary to carry out more extensive research with different drugs from these classes in order to better assess the safety and efficacy of these combinations, [2,12] as such use could lead to more frequent side effects than monotherapy.[3]

In patients who are intolerant to the use of ACE inhibitors or ARBs, or with allergies to hyperkalemia, for example, the use of calcium

channel blockers proved to be effective in controlling blood pressure and for renal protection.[12]

Glycemic control

Insufficient glycemic control (hyperglycemia) has been associated with an increased risk of diabetic nephropathy[2] and with the development and progression of CKD.[2,12] In addition, diabetes and CKD are cardiovascular risk factors and together they synergistically increase cardiovascular mortality. Thus, patients with type 2 diabetes and nephropathy are more likely to die than to progress to the more severe stages of CKD [11]

As with the wider population, elderly patients with diabetes are clinically and functionally too heterogeneous for the setting of standardized rules. The suggested treatment, though adapted and prioritized for these patients, is inevitably highly complex and involves the use of polypharmacy.[11] Pharmacotherapy involves the use of medication from the metformin, repaglinide, sulfonylurea and insulin classes. In addition to pharmacological glycemic control, the adoption of a hyperglycemic diet is recommended, comprising no more than 130g of carbohydrates per day in order to reduce the toxic effects of hyperglycemia on the kidneys.[12]

In order to preserve renal function and considering both the benefits and risks, professional bodies related to the treatment of nephrology and diabetes recommend a global glycosylated hemoglobin target (A1C) of 7.0%.[2,12] Additionally, it is worth emphasizing that in debilitated patients there is an elevated risk of hypoglycemia, making it extremely important to control symptoms and prevent metabolic decompensation. For this purpose, a glycosylated hemoglobin level (A1C) of <8.5% is recommended.[11]

Control of Dyslipidemia

The treatment of dyslipidemia in the general population has important advantages, both for the reduction of cardiovascular risk and for the prevention of cardiovascular disease (CVD).[15] Use of statins has been recommended as a first-line treatment for patients with CKD [2,11,12,15] and has the potential to reduce levels of low density lipoprotein (LDL), as well as the risk of morbidity and mortality related to cardiovascular disease and declining renal function.[12]

However, more potent statins, such as rosuvastatin, have been associated with harmful effects on the kidneys, especially at higher doses or with the concomitant administration of other drugs that can increase blood levels. Thus, careful monitoring is recommended,[12] with emphasis on evaluation of creatine kinase (CK) dosage due to the risk of rhabdomyolysis, a more aggressive and severe form of myopathy[16] that can acutely exacerbate renal dysfunction.

Dietary changes

As regards dietary changes, considering that control of arterial hypertension is the basis for treatment of CKD patients, limiting sodium intake was described as a measure for the prevention and control of high blood pressure.[2] However, the focus of the studies reviewed was protein intake.[2,11,12,14]

A protein intake of 0.8g/kg/day for patients with stage 3 CKD was recommended, with a more pronounced reduction for those in stage 4, prioritizing the consumption of proteins with a high biological value.[14] According to Fouque & Guebre-Egziabher,[17] the recommended protein intake for patients in stages 3 and 4 of non-dialytic CKD is between 0.6 to 0.8g/kg/day.

Dietary restriction of protein can help improve renal function, decreasing urinary

albumin excretion and presumably reducing GFR decline.[12] In addition, it is suggested that the combination of a hypoproteic diet supplemented by ketoacids can delay progression of CKD without an accompanying deterioration of nutritional status.[14]

Based on various pieces of evidence, a more marked reduction in protein intake is recommended in individuals with more advanced, stage four CKD. In these patients, hypoproteic diet may slow the decline of renal function and relieve uremic symptoms caused by accumulation of urea, phosphorus, sulphates and organic acids. Commencement of dialysis can therefore be delayed.[14]

Despite the benefits cited from the adoption of a hypoproteic diet, long-term, randomized and controlled clinical trials are necessary in order to evaluate the risk-benefit balance of such a diet among the elderly.[14]

Weight reduction and smoking

Epidemiological studies have identified a relationship between lifestyle variables (diet, obesity, exercise and smoking) and CKD.[12]

Results of observational studies suggest that obesity is associated with the development of CKD, progression to ESRD and also mortality linked to CKD. In patients with normal initial weight, weight gain is to be avoided, since increased weight heightens the risk of CKD progression. Weight loss is recommended for overweight persons, especially due to its beneficial effects on the control of blood pressure and glycaemia.[2]

A body mass index (BMI), which expresses a relationship between the weight and height of an individual, of less than 25kg/m^2 is recommended, as is a waist circumference (WC) of <102 cm for men and <88 cm for women. Also, when possible, the practice of dynamic moderate intensity exercise (walking, running, cycling or swimming) for 30-60 minutes, four to seven days per week, is recommended.[2] It is worth noting that BMI recommendations do not specifically consider the existing cut off points for elderly individuals.

Smoking is associated with an increased risk of progressive CKD and ESRD or CKD-related death. Therefore, quitting smoking should be encouraged.[2]

Although benefits related to weight reduction and abstinence from smoking have been reported, the evidence is limited, making further research with consistent interventions necessary.[12]

Treatment approaches

There are various care models for CKD patients. One is the disease-oriented approach, demonstrating a direct causal relationship between observed signs and symptoms and underlying pathophysiological processes. This features the advantage of a systematic framework to guide and standardize disease management, evaluation of results and patient performance, with clearly defined disease processes.[10]

However, the adequacy of this approach has been questioned, especially for patients with limited life expectancy, functional impairment and complex comorbidities. For these patients, care models directed at the disease itself may fail to address the main concern of the goals of the patient and, in doing so, can lead to inappropriate treatment strategies, with the potential of causing greater harm than good.[10]

Due to the limitations of care models directed at the disease itself in older populations, a more individualized and patient-centered approach, specific for the elderly, has been adopted. This approach prioritizes the goals and preferences of

the patient and integrates the notion that signs and symptoms are not necessarily the result solely of disease process, but reflect the complex interaction between disease processes, ageing and psychological and social factors.[10] Therefore, as the treatments themselves can also have a serious impact on the quality of life of older people and their caregivers, it makes sense to discuss with patients about their treatment preferences and what results they are hoping for.[11]

Another potential method discussed in the literature is the multidisciplinary approach. The results of several observational studies have shown links between clinical care in multidisciplinary CKD and better clinical outcomes, and preliminary economic analyzes also suggest that this approach can be financially viable.[2]

Referral to a nephrologist

Several recent findings indicate that early diagnosis of CKD, management of its complications and early referral to medical specialists can positively impact patients with renal dysfunction.[5,9,13] Furthermore, it should be noted that late referral for the management of CKD is associated with increased morbidity and mortality in patients. Therefore, assessment by a nephrologist is strongly recommended for patients with a GFR of less than 30mL/min/1.73m^2, and should also be considered for patients with stage 3 CKD.[9]

The role of the nephrologist is essential, as it involves issues of proper diagnosis and a greater expertise in specific therapies than other medical specialties, as well as a superior ability to solve the problems that may arise during clinical follow-up. Although care for CKD patients by nephrologists is not always ideal, recent efforts involving comprehensive management with nephrology consultation seem promising.[13]

DISCUSSION

Therapeutic interventions that aim to delay the progression of CKD focus on the treatment of risk factors associated with its development and aggravation, such as high blood pressure, diabetes, obesity and smoking. Thus, strategies to reduce CKD prevalence should include programs of lifestyle modification and, possibly, pharmacological interventions in high-risk patients.[18] It is worth mentioning that these therapeutic interventions produce better effects when instituted early in the course of renal disease.[14]

Regarding the control of blood pressure and its benefits in delaying the progression of CKD and in the avoidance of cardiovascular risk, the use of ACE inhibitors and/or ARBs as first-line treatment for patients with CKD has been recommended. It is important to highlight that available data on the renal outcomes of these drugs on the elderly is scarce, especially in individuals aged over 70.[3,10,12] However, it must be considered that this recommendation is derived from the guidelines of the Kidney Disease Outcomes Quality Initiative (KDOQI)[19] and, although most of the studies did not focus on persons aged over 70, the evidence of reviews conducted on the use of these drugs was positive.

In recognizing that a lack of glycemic control is associated with an increased risk of diabetic nephropathy and with the development and progression of CKD and cardiovascular mortality, it is essential that treatment of elderly patients with diabetes be individualized and adapted specifically, since this population presents special needs, meaning care should be integrated into a multidisciplinary approach. Such an approach must be cautious in the treatment of hyperglycemia in elderly patients with advanced CKD, taking note of a number of associated comorbidities and of limited life expectancy.[11]

Also regarding glycemic control, although the use of metformin is a mainstay in the treatment of adults and elderly people with type 2 diabetes mellitus,[20] care must be taken with the use of this oral hypoglycemic agent in patients with CKD, since metformin excreted in the kidneys increases the risk of accumulation and lactic acidosis associated with decreased renal function. Therefore, current recommendations on the use of this drug on patients with CKD suggest a reduction in dosage for those in stages 3a and 3b and complete suspension in stages 4 and 5 (GFR <30mL/min/1.73m^2).[22]

The prevalence of CVD in CKD sufferers is higher than in the general population, and constitutes the main cause of death for these patients.[23] Therefore, appropriate care of CKD patients involves not only interventions that slow the decline of GFR, but also the management of cardiovascular diseases and their risk factors.[7]

Dyslipidemia is common in CKD, being one of the main contributors to CVD-related morbidity and mortality.[12] In the early stages of renal disease, the predominant lipid modifications are hypertriglyceridemia and low levels of high-density lipoprotein (HDL). However, as CKD progresses, elevated levels of LDL cholesterol become more common.[24] According to the *National Health and Nutrition Examination Survey* (NHANES) 2003-2006, 26.3% of adult CKD stage 1 and 2 patients aged 20 years or over showed reduced HDL levels and 31.0% presented hypertriglyceridemia. In relation to elevated LDL, data from the 1999-2006 NHANES showed a prevalence of 46% for this lipid abnormality in adults with CKD in stages 1-2 and 80% for those in stages 3-4.[25]

It should be noted that CKD patients are more likely to die of cardiovascular causes than renal failure,[11,12] since, in addition to the traditional risk factors for the development of cardiovascular disease (arterial hypertension, diabetes mellitus and dyslipidemia), CKD brings its own risks such as vascular calcification, mineral metabolism disorders and fluid overload.[26]

It follows, therefore, that proper treatment of dyslipidemia and other risk factors for the development of CVD is necessary. Special care should be given to the treatment of elderly patients with CKD, especially those with advanced CKD and ESRD, with continuous evaluation of the lipid abnormalities which increase risks in each patient. Additionally, there is a need for more specific research into dyslipidemia in CKD sufferers among the elderly population, in relation to the progression of kidney and cardiovascular diseases.[15]

Dietary changes in individuals with CKD have demonstrated some benefits for the control and prevention of arterial hypertension, in delaying decrease in renal function and in the relief of uremic symptoms. However, in relation to the control of arterial hypertension, there is a focus on pharmacological treatment, and it is therefore important to promote measures to encourage adequate nutrition, especially regarding the control of salt intake by chronic renal patients.

One of the main objectives of nutrition therapy in cases of CKD is its contribution to alleviating the clinical manifestations of uremic syndrome. In this context, protein restriction can be beneficial in improving uremic symptoms by reducing the accumulation of toxic nitrogen compounds,[27] although it can lead to loss of lean mass and malnutrition, more frequently in elderly patients.[1] Given the above, the importance of nutrition should be stressed, with the adoption of a prescriptive diet that contributes to the adequate treatment of these patients, including the alleviation of uremic symptoms and consideration of the complexity of nutritional care.

Although more recent studies have shown that protein restriction benefits individuals with CKD, a more careful approach is required for elderly patients. In this population, a hypoproteic diet can contribute to the development of sarcopenia, and to frailty and functional impairment, resulting in deprivation, frustration, and social isolation.[14] In addition, it is also important to point out that older people generally reduce their protein intake spontaneously.[11,14]

Thus, to recommend a hypoproteic diet for elderly patients with CKD, three main conditions must be met in order to avoid malnutrition: 1) adequate caloric intake; 2) at least 60% of the protein intake should be of high biological value or have a high essential amino acid content; and 3) physical exercise should be encouraged to prevent degradation of muscle protein. It is also important that a careful nutritional assessment is carried out when an elderly individual begins a restrictive diet,[14] along with nutritional monitoring so that nutritional status is not adversely affected by the recommended protein restriction.

The combination of a low protein diet with the supplementation of essential amino acids or ketoacids is an alternative to conventional protein restriction (0.6 to 0.8 g/kg/day) for patients in stages 4 and 5 of CKD who are not on dialysis, allowing a greater reduction of protein intake (0.3g/kg/day). However, despite being a realistic, safe and effective diet for the postponement of dialysis, including for the elderly, it must be accompanied by regular monitoring of patients by a nephrologist and a nutritionist in order to avoid nutritional risk.[28]

The effects of dietary protein restriction on the prevention of CKD progression have been notoriously controversial because of the design characteristics of the studies in question and also because of inconclusive and contradictory results returned by randomized controlled trials.[2,14] In this regard, the effects of a hypoproteic diet on reducing urinary albumin excretion in diabetic nephrotic patients should be highlighted. In a meta-analysis of randomized controlled trials that determined the effect of hypoproteic diets on renal function in patients with diabetic nephropathy, it is suggested that, despite the limitations of the studies, a restricted protein diet was not associated with a significant improvement in renal function markers[29] and thus early protein restriction in the diet of these patients could contribute to the development of severe malnutrition.

These results point to the need to carry out a greater number of methodologically sophisticated studies seeking to clarify the benefits of and the recommendations for protein restriction in elderly patients with CKD.

In fact, on viewing the results of epidemiological studies regarding the relationship between lifestyle related variables (diet, obesity, exercise and smoking) and CKD,[12] it was found that most did not emphasize lifestyle changes. Among the studies evaluated, only one mentions these variables, while a second adds only a little information regarding the importance of weight loss and abstinence from smoking, without recommending specific measures for the elderly. Therefore, more effective study of these aspects in elderly patients with CKD is necessary, particularly given the worldwide increase in the elderly population and in CKD prevalence.

Also in relation to lifestyle, specifically with regard to weight loss, James et al.[2] suggest weight reduction in overweight patients, aiming at a BMI below 25kg/m^2 and a WC <102 cm for men and <88 cm for women. The use of BMI as a tool for assessment of nutritional status in patients with CKD has been the subject of discussion in literature. According to Carrero & Avesani,[30] despite its use in epidemiological studies and in clinical practice, BMI may not be a very precise tool in monitoring of body fat or nutritional status, particularly in cases of CKD.

The authors offer various explanations for this argument: [30] a) BMI does not differentiate between body compartments such as fat and muscle; b) it does not capture changes in body

composition associated with aging; c) there is no differentiation between differences in body shape between genders; d) it does not distinguish body fat distribution – central and peripheral; e) fluid overload in CKD confuses BMI assessment. Regarding WC, procuring a precise measurement can be very difficult in very obese patients. Therefore, given the importance of body composition in the prognosis of patients with CKD and the use of BMI and WC in clinical practice should not occur in isolation, but in combination with other methods and tools to assess nutritional status and body composition, in order to establish an adequate nutritional diagnosis.

Various patient care models have been proposed. The more traditionally employed approach is guided by the course of the progression of the disease, while a more individualized and patient-centered method is slowly gaining ground, as is a multidisciplinary approach.

The elderly do not always prefer care that prolongs life, especially when it comes at the expense of comfort. They tend to prefer to remain independent in their normal daily activities and to avoid becoming a burden to their families.[11] In this context, for many older people with CKD, an individualized, patient-centered approach may have more to offer than the traditional approach guided by disease progression. An important feature of the individualized approach is that it can always accommodate strategies for treatment of the underlying disease as long as they align with the patient's objectives and preferences.[10]

As for the multidisciplinary approach, it is worth mentioning that even though many nephrologists are currently experiencing the benefits of this care in chronic kidney disease clinics, convincing evidence for its efficacy from relevant clinical results is still scarce[2] and the majority of studies that assess this approach contain a limited representation of elderly patients. However, given the complexity of CKD, coupled with the clinical problems inherent in aging, the interdisciplinary care model, in facilitating multidimensional assessment of patients, emerges as the best form of treatment for elderly CKD sufferers.[31]

However, although multidisciplinary and individualized patient-centered approaches seem to bring many benefits in patient care, it should be remembered that doctors and other health professionals may be inadequately prepared to identify the preferences and goals of patients and incorporate these into treatment strategies. Furthermore, there may be little evidence to support treatment decisions in cases where the specific objectives of an individual patient have not yet been studied.[10]

Regarding the early referral of CKD patients to a specialist, while this procedure appears to presents beneficial results, the number of practicing nephrologists is insufficient to care for all patients with CKD.[5,7] According to recent clinical guidelines, many conditions affecting patients suffering from the early stages of CKD may be resolved with care provided by primary care physicians or other specialists.[7] At the same time, care provided by primary care physicians for CKD may be of inferior quality and may not comply with CKD guidelines.[5]

According to a study carried out by Rothberg et al.[4] primary care physicians do a relatively good job of managing CKD when it is identified, but do not have the tools to diagnose it when serum creatinine levels remain normal or when patients do not have diabetes or arterial hypertension, and this can lead to inappropriate treatment. Therefore, efforts should focus on helping physicians better identify patients with decreased GFR and on ensuring that nephrologists and other experts adopt a broader view of care for CKD patients.[7]

Thus, the issue of referral to a nephrologist involves two aspects. Firstly, the number of specialists does not match patient demand and it is not necessary to refer all CKD patients, especially those in the early stages of the illness,

and secondly, those patients who could be treated successfully at the primary care stage are often treated by ill-prepared doctors.

Recently, a new version of the CKD guidelines, prepared by the Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group, was published. It recommends that the referral of CKD patients to specialized nephrology services is performed in the following situations: a) acute kidney injury or sudden and maintained drop in GFR; b) GFR <30 ml/min/1.73m^2 (stages G4-G5); c) significant albuminuria (albumin/creatinine ≥300 mg/g; albuminuria ≥300mg/24h, which is equivalent to approximately protein/creatinine ≥500 mg/g or proteinuria ≥500mg/24h); d) advancement of CKD; e) hematic casts and hematuria (>20/pc) maintained and not easily explained; f) CKD and hypertension refractory to treatment with four or more antihypertensive agents; g) persistent changes in serum potassium; h) hereditary renal disease.[1,32]

To deal with the above issues, further educational efforts are needed to increase the knowledge of professionals regarding clinical guidelines on CKD, with the aim of improving management of the disease and clinical outcomes. In addition, more research into new methods for the identification of cases of the illness and the provision of care in different contexts is necessary due to the high and growing global prevalence of CKD.

CONCLUSION

Based the findings of the present study, it can be concluded that treatment for patients with chronic kidney disease is limited and includes therapeutic interventions involving control of blood pressure, diabetes and dyslipidemia, dietary changes, weight reduction and stopping smoking. However, there are few treatments aimed directly at the physiopathological process of renal failure,[12] possibly due to the complexity of pathophysiological treatment, since it involves the replacement of normal tissue by a fibrous equivalent, which is an irreversible process. Thus, this treatment is focused on preventing glomerular sclerosis and interstitial fibrosis and its progression.

The therapeutic focus is on the treatment of the underlying illnesses and complications of kidney disease. If diabetes and high blood pressure were treated properly, it would not only reduce the risk of chronic kidney disease and end stage renal disease, but also the risk of mortality associated with these illnesses.

It is worth reemphasizing that were renal disease included in the context of primary health care, referral to specialists would be possible and primary care physicians could manage patients with chronic kidney disease in its early stages.

Although there is an apparent effort by researchers to institute more suitable therapeutic approaches for the management of chronic kidney disease, there is still little evidence of interventions that improve the chances of survival for elderly sufferers. Some interventions, however, do prevent its exacerbation and delay its progression.

Thus, the treatment of patients from the elderly population presents a set of characteristics which must be more clearly understood and individualized, making necessary further randomized and controlled long-term studies of elderly individuals with chronic kidney disease, in order to discover the most effective therapeutic procedures for the control of this illness.

Finally, in treatment of elderly patients with chronic kidney disease, the greatest possible delay on progression to the terminal stages of the illness must be sought, given that dialysis is accompanied by negative impact and limitations that translate into a reduced quality of life for patients.

REFERENCES

1. Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group. KDIGO 2012 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. Kidney Int 2013;3(1):1-150.
2. James MT, Hemmelgarn BR, Tonlelli M. Early recognition and prevention of chronic kidney disease. Lancet 2010;375(9722):1296-309.
3. Turgut F, Balognun RA, Abdel-Rahman EM. Renin-angiotensin-aldosterone system blockade effects on the kidney in the elderly: benefits and limitation. Clin J Am Soc Nephrol 2010;5(7):1330-9.
4. Rothberg MB, Kehoe ED, Courtemanche AL, Kenosi T, Pekow PS, Brennan MJ, et al. Recognition and management of chronic kidney disease in an elderly ambulatory population. J Gen Intern Med 2008;23(8):1125-30.
5. Agrawal V, Ghosh AK, Barnes MA, McCullough PA. Awareness and knowledge of clinical practice guidelines for CKD among internal medicine residents: A national online survey. Am J Kidney Dis 2008;52(6):1061-9.
6. Stevens PE, Levin A. Evaluation and management of chronic kidney disease: synopsis of the Kidney Disease: Improving Global Outcomes 2012 Clinical Practice Guideline. Ann Intern Med 2013;158(11):825-30.
7. Levey AS, Stevens LA, Coresh J. Conceptual Model of CKD: applications and implications. Am J Kidney Dis 2009;53(Suppl 3):4-16.
8. United Nations, Department of Economic and Social Affairs, Population Division. World Population Prospects: the 2012 Revision. New York: United Nations; 2013.
9. Lane B, Poggio ED, Herts BR, Novick AC, Campbell SC. Renal function assessment in the era of chronic kidney disease: Renewed emphasis on renal function centered patient care. J Urol 2009;182(2):435-44.
10. Bowling CB, O`Hare M. Managing older adults with CKD: individualized versus disease-based approaches. Am J Kidney Dis 2012;59(2):293-302.
11. Abaterusso C, Lupo A, Ortalda V, De Biase V, Pani A, Muggeo M, et al. Treating elderly people with diabetes and stages 3 and 5 chronic kidney disease. Clin J Am Soc Nephrol 2008;3(4):1185-94.
12. Pyram R, Kansara A, Banerji MA, Loney-Hutchinson L. Chronic kidney disease and diabetes. Maturitas 2012;71(2):94-103.
13. Patel UD, Young EW, Ojo AO, Hayward RA. CKD progression and mortality among older patients with diabetes. Am J Kidney Dis 2005;46(3):406-14.
14. Giordano M, Ciarambino T, Castellino P, Paolisso G. Light and shadows of dietary protein restriction in elderly with chronic kidney disease. Nutrition 2013;29(9):1090-3.
15. Choudhury D, Tuncel M, Levi M. Disorders of lipid metabolism and chronic kidney disease in the elderly. Semin Nephrol 2009;29(6):610-20.
16. Maji D, Shaikh S, Solanki D, Gaurav K. Safety of statins. Indian J Endocrinol Metab 2013;17(4):636-46.
17. Fouque D, Guebre-Egziabher F. Do Low-Protein diets work in chronic kidney disease patients? Semin Nephrol 2009;29(1):30-8.
18. Kiberd B. The chronic kidney disease epidemic: stepping back and looking forward. J Am Soc Nephrol 2006;17(11):2967-73.
19. National Kidney Foundation. K/DOQI Clinical Practice Guidelines for Chronic Kidney Disease: Evaluation, Classification and Stratification. Am J Kidney Dis 2002;39(Supl 1):1-266.
20. Iglesias P, Heras M, Díez JJ. Diabetes mellitus and kidney disease in the elderly. Nefrologia 2014;34(3):285-92.
21. Herrington WG, Nye HJ, Aung T. Metformin use in chronic kidney disease: new evidence to guide dosing. QJM 2013;106(11):1059-61.
22. Ioannidis I. Diabetes treatment in patients with renal disease: Is the landscape clear enough? World J Diabet 2014;5(5):651-8.
23. Abreu PF. Epidemiologia. In: Cuppari L, Avesani CM, Kamimura MA. Nutrição na doença renal crônica. Barueri: Manole; 2013. p. 3-31.
24. Sociedade Brasileira de Cardiologia. 5ª Diretriz brasileira de dislipidemias e prevenção da aterosclerose. Arq Bras Cardiol 2013;101(4 Supp 1):1-22.
25. United States Renal Data System. 2008 Annual Data Report: Atlas of End-Stage Renal Disease in the United States. Vol 2. Bethesda: National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases; 2008.
26. Bucharles SGE, Varela AM, Barberato SH, Pecoits-Filho R. Avaliação e manejo da doença cardiovascular em pacientes com doença renal crônica. J Bras Nefrol 2010;32(1):120-7.

27. Cuppari L. Fase Não Dialítica. In: Cuppari L, Avesani CM, Kamimura MA. Nutrição na doença renal crônica. Barueri: Manole; 2013. p. 217-46.

28. Aparicio M, Bellizzi V, Chauveau P, Cupisti A, Ecder T, Fouque D, et al. Do Ketoanalogues still have a role in delaying dialysis initiation in CKD predialysis patients? Semin Dial 2013;26(6):714-9.

29. Pan Y, Guo LL, Jin HM. Low-protein diet for diabetic nephropathy: a meta-analysis of randomized controlled trials. Am J Clin Nutr 2008;88(3):660-6.

30. Carrero JJ, Avesani CM. Pros and cons of body mass Index as a nutritional and risk assessment tool in dialysis patients. Semin Dial 2015;28(1):48-58.

31. Bastos MG, Oliveira DCQ, Kirsztajn GM. Doença renal crônica no paciente idoso. Rev HCPA 2011;31(1):52-65.

32. Kirsztajn GM, Salgado N Filho, Draibe SA, Netto MVP, Thomé FS, Souza E, et al. Leitura rápida do KDIGO 2012: Diretrizes para avaliação e manuseio da doença renal crônica na prática clínica. J Bras Nefrol 2014;36(1):63-73.

Received: July 01, 2014
Revised: Feb 27, 2015
Accepted: Apr 14, 2015