Clinical and epidemiological prevalence of glomerulopathies elderly in the city of Uberaba - MG

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Abstract

Introduction: Currently, the elderly population of Brazil is suffering significant increase. Aging is a physiological process that causes changes in various organs, including the kidney. A kidney biopsy is of paramount importance to clarify the morphological changes of these entities. **Objectives:** The aim of this work was to conduct a clinical epidemiological analysis of elderly patients and evaluate the prevalence of major glomerulopathies that affect. **Methods:** This is a retrospective and descriptive, with a review of 104 reports of renal biopsies of elderly aged over 60 years, performed in the Nefropatologia Federal University of Triângulo Mineiro (UFTM), between periods January 1996 and December 2010. Patients were grouped according to clinical syndrome. **Results:** We reviewed 104 biopsies of elderly patients. Of these, 52.94% were male. The Hypertension was found in 50.54% of patients. The clinical syndrome was the predominant nephrotic syndrome (42.17%). Most disease was glomerular origin. The glomerulopathy was the most prevalent (34.07%). **Discussion/Conclusion:** Through this review, we noted that the nephrotic syndrome was the main clinical syndrome and Podocytophaties glomerulopathies were more prevalent in the group of elderly patients undergoing renal biopsy. The analysis of renal biopsies of elderly patients is of paramount importance, since knowledge of the clinical manifestations of major glomerulopathies that affect this group, to assist in establishing the diagnosis and therapeutic management.

Keywords: aged; epidemiology; kidney.

Introduction

The elderly population in Brazil has increased significantly, thanks to several factors, among them, improvements in quality of life and enhanced health care, factors that contribute to increased life expectancy. According to the Ministry of Health,[1] the elderly are persons of both genders, aged 60 or older.[2,3]

Aging is a physiological process that causes changes in many organs, including the kidney, with subsequent structural and functional changes, including reduction of glomerular filtration rate. For these reasons, the elderly are more likely to develop kidney diseases.[4] In addition, elderly patients have a higher frequency of other overlapping clinical problems and more impaired general health condition. This fact raises concerns regarding kidney biopsy complications, because it is an invasive procedure, leading to restrictions in its indications and treatment of kidney diseases with immunosuppressants.

Regarding kidney transplantation, elderly donors have delayed graft function and worse graft survival in the long term when compared to transplantation from donors aged less than 50 years.

Histologically, the characteristic lesion of senile kidney is glomerular sclerosis. The number of glomeruli

decreases by 30-50%, with an increase in normal/sclerotic ratio: 1 in 10 glomeruli in the age of 80, to 1 in 100 in non-elderly adults. The mesangium shows varying degrees of expansion and interstitial fibrosis. The tubules are diminished in number, volume and expansion.[5]

Glomerular disease patterns observed in the elderly are similar to those observed in the general population. However, older patients have usually a mixture of different entities, most commonly hypertensive nephrosclerosis and atherosclerosis. Other kidney diseases also observed more frequently among the elderly are: membranous nephropathy, vasculitis (Wegener's granulomatosis) membranoproliferative glomerulonephritis and amiloidosis.[6]

Clinically, glomerulopathies may present with proteinuria or isolated hematuria; nephrotic syndrome - characterized by peripheral edema, hypoalbuminemia, dyslipidemia associated with proteinuria; and/or nephritic syndrome with hypertension, elevated serum levels of urea, creatinine, and decreased glomerular filtration rate associated with hematuria.[7,8]

Minimum Change Disease (MCD), focal segmental glomerulosclerosis (FSGS) and membranous glomerulopathy (GM) are considered podocytopathies, because the lesion mainly involves the podocyte.[9] MCD glomerulopathy is characterized by lesions with minimal or no changes to the glomerulus, with no changes in the number of podocytes under light microscopy. The electron microscope shows ultrastructural changes in podocytes, such as fusion and deletion of podocyte processes.[10] The main clinical feature of this disease is nephrotic syndrome. FSGS is a disease characterized by segment fibrosis (affecting only a portion of the glomerular capillary loops) and focal (affecting less than 50% of the glomeruli). In this glomerulopathy, there is progressive podocyte injury that can result in podocyte depletion. It accounts for 15-20% of idiopathic nephrotic syndromes in adults. The main clinical presentation is proteinuria. Many patients also develop nephrotic syndrome, with hypertension and hematuria in over 30% of cases. Ordinary light microscopy may show segmental sclerosis of some glomeruli, or even totally sclerosed glomeruli.[11]

Renal biopsy is extremely important to clarify the etiology and morphological changes associated with these entities. The information obtained by renal biopsy associated with epidemiological, genetic and environmental factors involved can provide a wide view over the spectrum of diseases in the elderly.[12]

The characterization of patients in a given region is the first step to identify potential prognostic factors that may influence the course of disease. However, in Brazil, glomerulopathy records are still scarce, but undoubtedly needed.[13]

Therefore, we intended to carry out a retrospective study in a Nephropathology Clinic in the state of Minas Gerais in order to characterize the main syndromes and entities that affected the elderly submitted to a biopsy in this region, tracing an epidemiological profile of these patients.

Materials and methods

The Nephropathology Service of the UFTM received 1725 biopsies between January of 1996 and December of 2010, and 104 (6%) of them belonging to elderly patients. We held a retrospective and descriptive study reviewing reports of renal biopsies from elderly patients aged over 60 years. The Research Ethics Committee of the Federal University of Triângulo Mineiro, under protocol number 998, approved this study.

Methods

We created an electronic spreadsheet (Microsoft Excel) with information contained in the reports and in the requests for biopsies associated with clinical data (gender, age, clinical syndrome, diagnosis, presence of hypertension) and laboratory info (values of proteinuria, creatinine, albumin, hematuria, glomerular filtration rate and total cholesterol).

Biopsies without glomeruli and arteries were considered unsatisfactory and biopsies with 10 glomeruli were deeded satisfactory. Glomerular sclerosis was considered pathological when there

were more than 10% of the total number of glomeruli involved, for we consider this value as the threshold for senile glomerular sclerosis.

Clinical syndromes were divided into: nephrotic syndrome (edema, proteinuria ≥ 3.5 g/24 h and hypoalbuminemia); nephritic syndrome (edema, hematuria, proteinuria < 3.5 g/24 h and acute reduction in renal function associated with newly onset hypertension); acute renal failure (supposedly recent rise in serum creatinine, without apparent cause and without conclusive signs of advanced chronic kidney disease) and hematuria and/or pure proteinuria (glomerular hematuria and proteinuria - concurrent or not).

The diagnoses were divided into glomerular diseases (podocyte diseases, membranous glomerulonephritis, amyloidosis, crescentic glomerular disease, membranoproliferative glomerulonephritis, chronic glomerular disease, acute diffuse glomerulonephritis, lupus nephritis, diabetic nephropathy and segmental glomerulonephritis) and other diseases (hypertensive nephropathy, cylinder nephropathy, acute tubular necrosis and acute tubulointerstitial nephritis).

Tissue fragments were subjected to histopathological analysis, which was composed of macroscopic evaluation, light microscopy (staining and immunohistochemistry) and transmission electron microscopy when needed.

Results

We assessed 102 biopsies from elderly patients. Of these, 48 (47.05%) were from females and 54 (52.94%) from males. The mean age was 68 ± 6.24 years. We found hypertension in 50.54% of patients. Serum creatinine levels were 3.62 ± 1.59 mg and proteinuria was 3879.1 ± 3374.5 mg (Table 1).

In relation to clinical syndromes, nephrotic syndrome was present in 42.17% of cases, proteinuria and hematuria in 27.45%, nephritic syndrome in 18.65% and acute renal failure in 11.76% (Table 2).

Table 1 Demographic and clinical data from the patients upon biopsy

	n	%
Age	68 ± 6.24	
Gender: Female	48	47.06
Male	54	52.94
Hypertension: Yes	45	no
No	46	yes
Creatinine (mg/dl)	3.62	
Proteinuria (g/l)	3879.1	

Table 2 Clinical syndromes distribution

	n	%
Nephrotic syndrome	43	42.17
Proteinuria and pure hematuria	28	27.45
Nephritic syndrome	19	18.62
Acute renal failure	12	11.76

The most prevalent glomerular diseases were podocytopathies (FSGS or LM) - 34.07% of cases; membranous glomerulopathy in 25.28% of biopsies: thirteen (13.7%) patients in stage I; seven (7.8%) in stage II and three (2.9) patients in stage III and crescentic glomerulonephritis in 13.20% of biopsies: three type I cases (2.94%) (antimembrane basale), two (1.9%) Type II patients (immunocomplex) and seven (6,8%) cases of type III (pauci-immune) (Table 3).

We also analyzed the prevalence of other renal diseases, wherein cylinder nephropathy was prevalent in 45.46% of cases, followed by hypertensive nephropathy in 36.36% of the cases (Table 4).

Among patients with clinical nephrotic syndrome, glomerulopathies (podocytopathy and membranous glomerulopathy) were present in 15 cases.

Among patients who had clinical features compatible with nephritic syndrome, four cases had podocytopathy as glomerular diseases.

Among patients with clinical features of Acute Renal Failure, six had renal changes compatible with crescentic glomerulopathy; one had membranous glomerulopathy; one had lupus nephritis and one had chronic glomerulopathy.

Table 3 Distribution of glomerulopathy among the elderly

	n	%
Podocytopathies	31	34.07
• FSGS or ML		
• Membranous Glomerulopathy	23	25.28
• Stage I	13	56.52
• Stage II	7	30,43
• Stage III	3	13.04
Crescentic Glomerulopathy	12	13.20
• Type I-Basal antimembrane	3	25
• Type II-Immune complexes	2	16.6
• Typo III-Pauci-immune	7	58.33
Lupus Nephritis	7	7.69
IgA/Berger Nephropathy	4	4.39
• Grade I	2	50
• Grade II	1	25
• Grade III	1	25
Chronic glomerulopathy	3	3.29
ADGN	3	3.29
Amyloidosis	3	3.30
PMG	2	2.20
Diabetic Nephropathy	2	2.19
Segmental glomerulonephritis	1	1.10

Table 4 Frequency of other renal diseases

	n	%
Cylinder nephropathy	5	45.46
Hypertensive nephropathy	4	36.36
ATN	1	9.09
TIN	1	9.09

ATN: Acute Tubular Necrosis; TIN: Tubulointerstitial Nephritis.

Discussion

Similarly to what happens to many other organs, human kidneys, also suffer structural and functional changes associated with aging, such as reduced weight and volume, more glomeruli with global sclerosis and reduction in plasma flow and in glomerular filtration rate. Renal biopsy is the gold standard medical procedure for the diagnosis of kidney diseases. However, when indicated for elderly patients with comorbidities, many still maintain a conservative behavior towards invasive diagnostic procedures because of the risk of complications.[2,3] This fact might explain the number of cases we had in our study, a total of 104 cases throughout the 15 years the study was carried out.

In our study, most cases were represented by men, which is similar to the study by Rivera *et al.*, which results suggest that men are predominant in the major clinical syndromes throughout the population.[14]

Most of the seniors in our study had hypertension as underlying disease; however, we found more females with this disorder. This finding differs from other authors, whose results showed males as those more affected with hypertension, explaining that men are less informed about the disease and do not seek effective treatment for it.[15,16]

Nephrotic syndrome was the main clinical syndrome among the elderly investigated. These data corroborate other studies in the literature.[2,4,17]

Among the diseases that affect the kidneys, the ones concentrated in the glomeruli, known as glomerulopathies, were the most common among the diagnoses. Those affected are often asymptomatic, which hinders patient care. In the elderly, this characteristic is even more worrisome because they have other clinical problems.[2,4,17,18]

In relation to glomerular diseases, podocytopathies disorders represented 34% of them, being the most prevalent membranous glomerulopathy. These findings contrast with other studies in elderly patients[4,6,17] and differ from another study, in which membranoproliferative glomerulonephritis was the main glomerular disease in that population.[1] Furthermore, podocyte disorders were the main disorders responsible for the development of nephrotic syndrome in elderly patients. Histopathological diagnosis of minimal changes in the elderly was considered difficult due to the several interposition of tubulointerstitial and vascular lesions affecting them.[3]

Among patients with clinical settings of acute renal failure, crescentic glomerulonephritis was the main histopathological change; however, in the study by Oliveira *et al.* acute tubular necrosis was the main diagnosis among patients in this same clinical setting.[2]

Considering the aging population and its high scalability, healthcare professionals need to create strategies to ensure increased quality of life for those who live longer. Studies in this field help identify these groups. This study is important because in addition to epidemiologically characterizing the elderly followed in our nephrology clinic, it showed the predominant kidney disease among this group, given that there is a lack of studies of this nature, especially in Brazil.[4]

Conclusion

Histopathological and epidemiological analyses of renal biopsies from elderly patients is of fundamental importance, because knowledge of the clinical manifestations and prevalence of major glomerulopathies that affect the elderly can help both nephropathologist and the nephrologist diagnose these entities and indicate the most effective therapy.

In our study, we observed that the nephrotic syndrome was the main clinical syndrome and podocyte diseases were the main histopathological diagnosis among elderly patients in the study group.

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