Epidemiology of Hypertension in Chronic Kidney Disease During One Year in Ambulatory Service of Hypertension in Durrës

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Abstract

Hypertension is a common and significant health problem worldwide, affecting approximately one billion individuals. Chronic kidney disease (CKD) is a progressive and irreversible condition, with hypertension being one of the most common comorbidities. The relationship between hypertension and CKD is complex and bidirectional, as hypertension is a major cause of CKD, and CKD can contribute to the development and worsening of hypertension. Additionally, hypertension is a major risk factor for cardiovascular disease, which is the leading cause of morbidity and mortality in patients with CKD. This abstract summarizes a study that aimed to investigate the prevalence of CKD in patients with essential hypertension in Albania and to identify associated risk factors. The study found a prevalence of 13.2% of CKD in patients with essential hypertension, which is comparable to other studies in the United States. Additionally, the study found that CKD was more prevalent in women and that diastolic blood pressure was significantly higher in patients with CKD. The study also evaluated the number and types of antihypertensive medications used to achieve target blood pressure levels, finding that the number of medications was significantly higher in patients with CKD and that ACE inhibitors or ARBs were the most commonly used medications. In conclusion, this study provides important information about the prevalence and risk factors associated with CKD in patients with essential hypertension in Albania. Early identification and management of hypertension and CKD are essential in reducing the burden of cardiovascular disease and improving patient outcomes.

Keywords: *Hypertension, chronic kidney disease, prevalence, risk factors, Albania*

1. Introduction

Hypertension and chronic kidney disease (CKD) are closely linked, with hypertension being a common cause and complication of CKD. According to the Centers for Disease Control and Prevention, hypertension affects nearly one in three adults in the United States, and the prevalence of CKD in the United States is estimated to be 15%, with hypertension being the leading cause of CKD [1], [2]. Hypertension can lead to damage of the blood vessels in the kidneys, resulting in decreased kidney function and the development of CKD. CKD can, in turn, exacerbate hypertension through a variety of mechanisms, including activation of the renin-angiotensin-aldosterone system, sodium retention, and sympathetic nervous system activation [3], [4].

The close relationship between hypertension and CKD highlights the importance of screening for and managing hypertension in patients with CKD. The American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines recommends a blood pressure target of less than 130/80 mmHg for patients with hypertension and CKD [5]. Treatment of hypertension in patients with CKD typically involves the use of renin-angiotensin-aldosterone system inhibitors, such as angiotensin-converting enzyme inhibitors or angiotensin receptor blockers, as well as diuretics and other antihypertensive medications [6].

2. Aim of the Study

The aim of this study is to obtain an epidemiological profile of essential hypertension and chronic kidney disease (CKD) in the population of patients with essential arterial hypertension in the city of Durrës for the year 2015, as well as to examine the medication treatment used according to drug groups. We select this year which was before Covid 19 to excluded any influence from it.

This information will help family doctors to have a more accurate orientation regarding the prevalence of CKD and vascular accidents (cerebral and cardiac) in patients included in the study, both with and without chronic kidney disease, and to prevent the development of CKD towards end-stage renal disease. Our aim is to determine the relationship between chronic kidney diseases in patients with essential hypertension, as well as to study the prevalence of possible vascular complications.

3. Materials and Method

This study observed 310 patients with an average age of 59.3±8.9 who were followed during the year 2015 at the hypertension clinic near the specialist polyclinic in Durrës. These were patients diagnosed with essential hypertension who were previously or currently receiving treatment.

Patients aged 18-80 were selected, of whom:

- ✓ 220 were females with an average age of 58.3 ± 8.6 years.
- ✓ 90 were males with an average age of 61.8 ± 9.08 years

The patients had different degrees of essential hypertension, while patients with the following conditions were excluded:

- ✓ Malignant hypertension
- ✓ Renal insufficiency
- ✓ Diagnosed secondary hypertension
- ✓ Chronic anti-inflammatory treatment
- ✓ Uncontrolled diabetes mellitus (blood glucose level >200mg/dl)

Based on the presence of renal problems, the patients were classified into two groups:

- ✓ Without renal disease
- ✓ With renal disease

The data collected for the study were:

- ✓ Systolic and diastolic blood pressure readings measured with a mercury sphygmomanometer in a seated position after 5 minutes in that position.
- ✓ Total cholesterol and creatinine levels measured in the blood.
- ✓ Medications used according to drug class.
- ✓ Sex
- ✓ Age
- ✓ Coexisting diseases or vascular complications

The coexisting diseases or vascular complications included:

- ✓ Non-renal
- Diabetes mellitus under treatment
- Coronary artery disease (post myocardial infarction, angina pectoris)
- Cerebrovascular accidents (transient ischemic attacks, thrombotic or hemorrhagic strokes)
- ✓ Renal (tubulointerstitial, glomerular, cystic)

The data were recorded in personal records for each patient, indicating their health status over time. The blood pressure readings were taken at the time of the visit.

The data obtained were statistically processed by the Department of Statistics at QSUT (Mother Teresa Hospital in Albania). Continuous variables were presented as mean values and standard deviations, while discrete variables were presented as absolute values and percentages. Data were presented in various types of tables. Chi-square test was used to compare changes between discrete variables. The values of $p \leq 0.05$ (or 5%) were considered significant. Data analysis was performed using SPSS 10.0 and Microsoft Excel with the SPSS 10.0 program.

4. Results

The study included 310 patients with an average age of 59.3 ± 8.9 years (aged 18-80 years). According to the data, it was found that females constituted 70.9% of the sample.

Table 1. Average age and standard deviation

Gender	*Average Age*	*Standart deviation (Stand. Dev)*
Female	*58.3*	*8.6*
Male	*61.8*	*9.08*

Table 2. Demographic characteristics of patients

Characteristics	*Number*	*No renal disease*	*With renal disease*	*P significat P ≤ 0.05*
Nr (%)	*310*	*269(85.1%)*	*41(14.9%)*	
Average Age ± St. Dev.	*59.3±8.9*	*59.7 ±8.8*	*56.4±9.2*	*>0.05 NS*
Female %	*70.9*	*70.7*	*72.*	
Systolic pressure (mmHg)	*156.5±21*	*156.3±17.5*	*156.5 ±21.5*	*>0.05 NS*
Diastolic pressure (mmHg)	*89.1±10.8*	*88.8±11.1*	*91.7±8.5*	*0.05 S*
Creatininemia (mg /dl)	*0.9±0.3*	*0.49±0.29*	*1.31±0.23*	*0.02 S*
Total Colesterol (mg/dl)	*238 ±41.2*	*228±39.2*	*250±43.9*	*<0.001 S*
Average PS-PD	*67.2±17.8*	*67.6±18.1*	*64±16*	*>0.05 NS*
ACEI (%)	*75.5*	*70.3*	*78*	*<0.001 S*
Medicametions	*2.16±0.8*	*1.9±0.9*	*2.5±0.7*	*<0.001 S*
Diabetes (%)	*13.4*	*13.8*	*12.2*	*>0.05 NS*

As seen, the average age of patients is lower in those with chronic kidney disease, 56.4 ± 9.2 years compared to those without CKD, which resulted in 59.7 ± 8.8 years, p>0.05 but not significantly.

Additionally, systolic blood pressure did not show a significant difference between the groups (156.3 ± 17.5 compared to 156.5 ± 21.5 mmHg, p > 0.05).

However, diastolic blood pressure was on average higher in the group with CKD (91.7 ± 8.5 compared to 88.8 ± 11.1 mmHg) with a significant difference of p = 0.05.

Creatinine and total cholesterol levels were significantly higher in patients with CKD compared to those without CKD (0.49 ± 0.29 versus 1.31 ± 0.23mg/dl, p = 0.02 and 228 ± 39.2 versus 250 ± 43.9mg/dl, p < 0.001, respectively).

The use of ACE inhibitors and ARBs in antihypertensive therapy was higher in CKD patients (78% versus 70.3%, p < 0.001). The number of antihypertensive medications used to control blood pressure within recommended levels was also significantly higher in CKD patients (2.3 ± 0.7 versus 1.9 ± 0.9 in those without CKD).

Systolic blood pressure did not differ significantly between the two groups (156.3 ± 17.5 versus 156.5 ± 21.5 mmHg, p > 0.05), while diastolic blood pressure was significantly higher in CKD patients (91.7 ± 8.5 versus 88.8 ± 11.1mmHg, p = 0.05).

Out of 310 patients included in the study, 68 or 22% of them presented with cardiovascular or cerebrovascular accidents (6 strokes, 3 myocardial infarctions (MI), 8 transient ischemic attacks (TIA), and 51 acute coronary syndromes (ACS)) as shown in Table 3. From the table, it can be observed that the most frequent vascular accidents were cardiac, with 54 cases compared to 14 cerebral cases.

Table 3. Distribution of vascular accidents

Vascular Accidents	*Stoke*	*MI*	*TIA*	*ACS*
With Chronic Renal Disease	*1*	*0*	*0*	*5*
No Chronic Renal Disease	*5*	*3*	*8*	*46*

In the studied patients, about 75% of vascular accidents were due to coronary artery disease, followed by 12% transient ischemic attacks (TIA), 9% cerebral vascular accidents (CVA- Stroke), and 4% acute myocardial infarction (IM).
Diabetes mellitus was found in 13.4% of the patients, respectively 13.8% and 12.2% in those with and without CKD.

Table 4: Distribution of diabetic subjects

Groups	*Diabetic*	*Non diabetic*
Chronic Renal Disease	*5*	*36*
No Chronic Renal Disease	*36*	*233*

Data from the study showed a prevalence of chronic kidney disease (CKD) of 13.2%. Among the 310-hypertensive patients, 41 of them had CKD, mostly tubulointerstitial, occurring after the onset of hypertension.

Table 5: Prevalence of CKD in essential hypertension.

Groups	*Total*
Chronic Renal Disease	*41*
No Chronic Renal Disease	*269*

The prevalence of CKD in essential hypertension was found to be 13.2% in the study. The mean creatinine level in the CKD group was 1.31 ± 0.23 mg/dl.

Table 6. Distribution of medicaments between groups with and without CKD.

Groups	*BB*	*DH/CCB*	*Diuretic*	*CCB*	*ACEI +ARB*
Chronic Renal Disease	*18*	*8*	*20*	*12*	*30*
No Chronic Renal Disease	*113*	*74*	*120*	*71*	*201*

The study found that ACE inhibitors + ARBs were the most commonly used medications, accounting for 75.5% of cases (201 patients) with and without CKD. Diuretics were the second most commonly used medication, with 120 and 20 patients without and with CKD, respectively. Beta-blockers were used in 113 and 18 patients without and with CKD, respectively. Dihydropyridine calcium channel blockers were used in 74 and 8 patients without and with CKD, respectively. Calcium channel blockers were used in 71 and 12 patients without and with CKD, respectively.

The use of ACE inhibitors and ARBs in anti-hypertensive therapy was found to be 75.5% in the study, with a significantly higher value in those with CKD at 78% compared to 70.3% in those without CKD, $p < 0.001$. Moreover, the number of medications used to control blood pressure within recommended levels was significantly higher in patients with CKD at 2.3 ± 0.7 compared to 1.9 ±0.9 in those without CKD.

5. Discussion

It should be emphasized at the outset that these data were collected in hypertensive patients with a positive family history of hypertension during 2015, and chronic kidney diseases were diagnosed during the treatment of hypertension. Urinary system concerns were manifested and diagnosed after they were diagnosed with hypertension some time ago. Patients with pre-existing chronic kidney disease diagnosed before or at the same time as the onset of hypertension were not the subject of our study. The renal pathologies that were diagnosed and constitute a real concern in our daily work are mainly tubulointerstitial. It was observed that the recurrence or occurrence of a chronic kidney disease corresponds to the destabilization of blood pressure levels in regularly treated patients. Diseases can influence in quality of life of the population [21], so chronic kidney disease should not be underestimated.

Several studies have shown that renal prognosis is not good in both hypertensive patients and the general population [4], [7], [8]. The HOPE study had a CKD prevalence of 10.4% based on creatinine values [9]. Perneger [10] reports those 1 in 13 hypertensive patients' progresses towards hypercreatininemia every year. Reynolds and others [11] report a worsening of renal function in 15% of treated hypertensive patients, also based on creatinine values. Although it is widely accepted that creatinine clearance is a more accurate indicator of GFR, numerous statistical data show that creatinine values are also closely linked to the development of CKD. Perneger [10] analyzed that every 0.1 mg/dl increase in creatinine increases the risk of CKD by 6 times.

In our study, the prevalence of CKD in essential hypertension was found to be 13.2%, which is comparable to studies conducted in the United States and discussed earlier. However, it has been suggested that this prevalence should be higher due to various factors discussed at the beginning. The average age of hypertensive patients with CKD was found to be lower than those without CKD (56.4 ± 9.2 years vs 59.7 ± 8.8 years). This result may be due to the structure of our study, as other studies on nephroangiosclerosis have shown a higher prevalence. It is understood that it takes years for nephrosclerosis to develop in hypertensive patients.

As with other studies of this type, it has been found that women have a higher percentage than men. In our study, they accounted for 71% of the total and 72% in those with CKD.

It is now widely accepted that both systolic and diastolic blood pressure are linked to renal risk. In our data, systolic blood pressure values did not show a significant difference, while diastolic blood pressure values were clearly higher in those with CKD than in those without CKD (91.7 ± 8.5 vs 88.8 ± 11.1, p=0.05).

Wide pulse pressure (PP > 80 mmHg) is a prevalent finding and is used as an indicator of arterial noise and an independent risk factor for cardiovascular disease. However, it should be emphasized that arterial noise is also encountered in advanced CKD. In our study, this value was higher, but not significantly so, in those without CKD, possibly because the average age of this group is higher.

In many multivariate analyses, age remains strongly and independently associated with pulse pressure.

In our study, the prevalence of CKD in essential hypertension was found to be 13.2%, which is comparable to the results from American studies and discussions that this prevalence should be higher due to certain factors that were discussed at the beginning.

The average age of hypertensive patients with CKD was lower than those without CKD (56.4 ± 9.2 vs 59.7 ± 8.8 years). We believe that this result is related to the structure of CKD in our study. In other studies, such as those studying nephroangiosclerosis, this figure is higher. It is understood that it takes years for nephrosclerosis to develop in hypertensive patients.

As in other studies of this type, it has been found that females have a higher percentage than males. In this study, women accounted for 71% of the total and 72% in those with CKD.

It is now widely accepted from many studies that both systolic and diastolic pressures are related to renal risk [17], [18], [19], [20]. In our data, systolic pressure values did not show a significant difference, whereas diastolic pressure values were clearly higher in those with CKD than those without CKD (91.7 ± 8.5 vs 88.8 ± 11.1, p = 0.05).

Wide pulse pressure (PS-PD > 80mmHg) is a prevalent value in recent data and is taken as an indicator of arterial noise and an independent risk factor for cardiovascular disease. However, it should be emphasized that arterial noise is also encountered in advanced CKD. In our study, this value was higher but not significantly in those without CKD, perhaps because the average age of this group is higher.

In the treatment guidelines for HTA, it is emphasized that a decrease in glomerular filtration rate below 60 ml/min per 1.73m², microalbuminuria, and small increases in creatinine or proteinuria constitute high cardiovascular risk factors. From the study on vascular events in the population under consideration, 22% of patients presented with stroke or cerebral ischemia, myocardial infarction, or angina. In those without CKD, they were 19.1% compared to 14.5% in those with CKD. Cerebral stroke was 2.4% in those with CKD compared to 1.9% in those without CKD. Coronary artery disease had a higher percentage in both groups. Other studies have demonstrated renal injuries by hypertension [12].

A part of our study was also the study of the number of antihypertensive preparations used to achieve recommended target values, as well as the structure of the groups of preparations used. Other studies have shown that a lower blood pressure suggests a long-term survival benefit and no change in CKD progression [13], [14]. Also other studies have shown that antihypertensive preparation, especially diuretics are recommended to prevent renal injury but not a combination of a loop and thiazide diuretics, as they can cause fluid depletion [15], [16].

From the data, it was found that the number of preparations used was significantly higher in hypertensive patients with CKD (2.3 ± 0.7 vs 1.9 ± 0.9), where an ACE inhibitor or ARB was used in 78% of cases. A diuretic was used in 38% of cases, and in 59% of those with CKD. It should be emphasized that there is resistance from patients in the use of

diuretic therapy, especially as a single therapy, perhaps due to wrong mentalities. Also, the structure of medication is conditioned by the limitations imposed by ISKSH.

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