

Frequency of the Cardiovascular Complications during the Chronic Renal Insufficiency with the Service of Nephrology of the National Hospital Donka

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Abstract

Introduction: Cardiovascular disease has become a major concern for the nephrologist as it is the leading cause of morbidity and mortality in patients with chronic kidney disease, and affects all stages of the disease, including the earliest stages of the disease. The goal of this work was to determine the frequency of cardiovascular complications during chronic kidney failure. **Patients and methods:** This was a six-month, descriptive cross-sectional study from March 01 to August 31, 2018. It covered all patients with chronic kidney disease hospitalized in the ward during the study period. Included were all chronic kidney failure patients with at least one cardiac and/or vascular complication diagnosed either on clinical examination, and/or paraclinical examination (Electrocardiogram or cardiac ultrasound, vessel echodoppler, scan). **Results:** During the study period, 84 out of 378 patients or 22.22% had at least one cardiovascular complication. Cardiovascular complications were hypertrophy of the left ventricle with 49/84 (44 at Electrocardiogram and 5 at cardiac echodoppler), valvulopathy with 33.33%, stroke with 50% of cases, obliterating arterial disease of the lower limbs 25%, hypokinetic dilated cardiomyopathy with 9/36 cases and pericarditis with 2/36. **Conclusion:** Cardiovascular complications affect both sexes and all ages. They were dominated by enlarged left ventricle, valvulopathy and dilated cardiomyopathy.

Keywords

Cardiovascular Complications, Chronic Kidney Failure, Donka Conakry

1. Introduction

According to the World Health Organization (WHO), cardiovascular disease is the set of disorders affecting the heart and blood vessels [1], which is the leading cause of death in patients with chronic kidney disease (CKD) [2].

The prevalence of cardiovascular disease is 10 to 30 times higher in patients with chronic kidney disease (CKD) than in the general population. This excess is partly related to an increased prevalence of “classic” risk factors such as high blood pressure, diabetes and dyslipidemia [3]. Cardiovascular disease has become a major concern for the nephrologist as it is the leading cause of morbidity and mortality in patients with CKD, and affects all stages of the disease, including the earliest stages of the disease [4].

In the United States of America, a 2016 study of cardiovascular complications in CKD showed that they were dominated by arteriosclerosis heart disease and congestive heart failure with a prevalence of 68.8% [5]. In France, a 2012 study showed that cardiovascular complications account for 26% of the causes of death of patients in CKD, the most frequently found were heart failure and coronary pathology [6].

In Algeria (Oran), a 2016 study on the prevalence of cardiovascular complications in CKD reported that the prevalence of cardiovascular complications in their series was 73.2% which are dominated by Arterial Hypertension in 84.30%, Left Ventricular Hypertrophy (LVH) in 77% of cases, acute coronary syndromes in 11% of cases [7]. The frequency and type of cardiovascular complications in CKD patients varied from study to study and from country to country, and we considered appropriately based on our means of exploration, conducting this study. The goal of this work was to determine the frequency of cardiovascular complications during chronic kidney failure.

2. Patients and Methods

This was a six-month, descriptive cross-sectional study from March 1 to August 31, 2018. It was performed in the nephrology department of Donka National Hospital and covered all patients with chronic kidney disease hospitalized in the ward during the study period. Included were all chronic kidney failure patients with at least one cardiac and/or vascular complication diagnosed either on clinical examination, and/or paraclinical examination (Electrocardiogram or cardiac ultrasound, vessel echodoppler, CT scan).

Our variables were quantitative and qualitative.

The Electrocardiogram (ECG): looking for:

Left atrial hypertrophy (LAH): retained in front of a too wide P wave (greater than 120 ms in DII).

Right atrial hypertrophy (RAH): in front of a too large P wave (greater than 2.5 mV in DII).

Left ventricular hypertrophy (LVH): increased Sokolow index = $SV1 + RV5$ or $V6 > 35$ mm.

Pericarditis: clinically restrained before pericardial friction and with the ECG we used four stages which were described by Holtzman:

- Stage I: over-shift of the ST segment with a normal or flattened T wave.
- Stage II: the ST segment and the T wave gradually become isoelectric (24th to 48th hour).
- Stage III: the ST segment is isoelectric and under shift of the T wave (for several weeks).
- Stage IV: return to normal of the T wave.
- The left branch block was retained in front of:
 - enlargement of the QRS complex.
 - exclusive R or M aspect in V6 and DI.
 - negative T waves in V4, V5, V6.
- The right branch block was retained in front of:
 - QRS wide > 0.12 s.
 - “trailing” waves in DI and V6.
- Atrial Fibrillation was retained before:
 - absence of sinus P wave.
 - Irregular tachycardia with fine QRS.
 - totally irregular R-R intervals.
 - fast QRS complexes (100 - 150/min).

Heart rhythm disturbances before:

- the different space between 2 QRS.
- the absence of a P wave before each QRS.
- Tachycardia: it was defined by a heart rate above 100 beats per minute.
- Bradycardia: it was defined by a heart rate below 50 beats per minute.
- The clinical signs of Right Heart Failure and Left Heart Failure were investigated clinically.
- Cardiac ultrasound: looking for a dilation of the heart chambers, an enlarged left ventricle, dilated cardiomyopathy, an ejection fraction (EF < 60%), a systolic dysfunction of the DV using the TAPSE < 12 mm, a relaxation disorder by calculating the ratio between the speed of the E wave and that of the A wave (E/A > 2).
- Doppler ultrasound of the lower limbs: looking for obliterating arterial disease of the lower limbs, deep vein thrombosis and clinically the sign of positive Homans (pain caused in the calf when the dorsiflexion of the foot).
- Cerebral computed tomography (CT): looking for signs of ischemic or hemorrhagic stroke and in the clinic paralysis of a limb or side, deviation of the mouth, facial paralysis, aphasia, loss of sensitivity.

Data collection and analysis: Data analysis and processing was carried out by the EPI info software in its 7.2 version and the software from the 2013 pack office (Word, Excel) used for document entry, table design.

Ethics; Before undertaking any field activity, the research protocol has been submitted to the nephrology-Hematology-Geriatrics Chair of the Faculty of Health Science and Technology of Gamal Abdel Nasser University in Conakry.

In the field, written informed consent was also obtained from patients included in our study. Participation in the study was entirely voluntary. No patients who declined to participate were included. Each patient signed or affixed their fingerprint to a voluntary and informed consent card that was read to them by the candidate. For patients unable to read the French language, a translation of the contents of the informed consent form was made in the local language in the presence of a witness or family member.

3. Results

In our study, more than 94% of the patients had a creatinine clearance of 30 ml/min or less. The average was 9.19 ml/min \pm : 14.15 (Table 1).

Table 2 shows that all patients benefited from the ECG and that LVH was the main complication observed. Fifty percent of the CT patients had cerebrovascular abnormalities.

It emerges from Table 3 that 3 out of 8 patients had vascular anomalies, *i.e.* 37.5%.

Table 1. Distribution of patients according to general characteristic.

SETTINGS	NUMBER	PERCENTYL
ECG	84	100
Tachycardia	29	38.16
Left Atrial Enlargement	3	4.35
Left Ventricular Enlargement	44	59.46
Right Ventricular Enlargement	1	1.47
Branch block	5	7.35
P�ricarditis	2	2.90
Brain Scanner	8	100
Hemorrhagic stroke	1	12.5
Isch�mic stroke	3	37.5
No anomalie	4	50

Table 2. Distribution of patients according to electrocardiogram (ECG) results and CT scan.

Characteristics	Number	Percentyl
Frequency	378	100
CKD + Other pathologies without CVC	294	77.78
CKD without CVC	84	22.22
Age		
Medium	47 \pm 15.27 ans	
Extremes	15 - 88 ans	
Sex	84	100
Male	45	53.57
Feminine	39	46.43

Table 3. Distribution of patients according to ultrasound results.

Settings	Number	Percentyl
Echocardiography	36	100
Hypokinetic dilated heart disease	9	25
Mitral insufficiency	4	11.11
Tricuspid insufficiency	7	19.44
Aortic insufficiency	1	2.77
Left Ventricle Enlargement	5	13.88
Renal Artery Stenosis	1	2.77
Dilatation of the left atrium	9	2.77
Lower limb ultrasound	8	100
Stenosis	1	12.5
Obliterating arteriopathy of the lower limbs	2	25
No anomalies	5	62.5

4. Discussion

During the study period, 378 patients were hospitalized for all nephrological conditions combined. Of these, 84 in CKD had at least one cardiovascular complication or 22.22% (Table 1). This result is significantly lower than that found by both AO et al in 2006 [8] 72.95% of cardiovascular complications. This difference could be explained by the difference in methodology used, including the length of study, sample size and exploration methods used.

The average age of our patients was 47 - 15.27 years with extremes of 15 - 88 years (Table 1). Our results are lower than those of B. Jerbi *et al.* in Tunisia [9] which reported, in an analytical retrospective study of the occurrence of major cardiovascular events in CKD patients, an average age of 52.98 years. In the literature, it is reported that the prevalence of CKD increases with age and CKD is a non-modifiable conventional cardiovascular risk factor [10].

Depending on gender we noted a male predominance of 53.57% versus 46.43% female with a sex ratio of 1.15 (Table 1). This high prevalence of men could be explained by the fact that most men in our series had a significant cardiovascular risk factor in addition to Arterial Hypertension. Our result is contrary to that of Bah AO, which found in its study 51.69% of women [8].

This finding could be explained by the fact that the majority of our patients were not sufficiently informed and educated about knowledge of chronic kidney disease as well as cardiovascular risk factors. The clearance of the minimum creatininemia of our patients was 0.9 ml/min and the maximum was 60 ml/min with an average of 9.19 ml/min. Clearance of creatininemia of 5 ml/min was observed in 59.74% of cases.

Our results are different from those of Bah AO *et al.* [8] who reported that 83.3% of patients had a clearance of creatinine 30 ml/min. Compared to the pa-

raclinical examinations performed, all patients benefited from ECG, 36 did the morphological examination and 8 did the brain scan. Cardiovascular complications were the hypertrophy of the LAH with 49/84 (44 at ECG and 5 at cardiac echodoppler), valvulopathies with 12 out of 36 who did the cardiac echodoppler, strokes with 4/8 cas, obliterating arterial disease of the lower limbs with 2/8 cases, dilated cardiomyopathy with 9/36 cases and pericarditis with 2/36 (**Table 2**).

The prevalence and types of cardiovascular complications vary from study to study and depending on the means of exploration used. So W. Berrachdi, N.F. Benatta *et al.* in 2016 [7] reported 73.2% of cardiovascular complications and were dominated by arterial hypertension in 84.30%, LAH 77% of cases, acute coronary syndromes in 11% of cases, strokes in 17.5% of cases, obliterating arterial disease of the lower limbs in 13.5% of cases.

A pathological tracing of ECG was observed in 88.10% of cases. The main abnormalities were left ventricular hypertrophy (59.46%), tachycardia (38.16%) and the branch block (7.35%) (**Table 2**). The prevalence of ECG abnormalities in our series was broadly comparable to that found by Chijioko *et al.* [11] or (86%) which found a prevalence of left ventricular hypertrophy twice as low as ours or 27.6%. This could be explained by the presence of anaemia and high blood pressure in our patients as the main contributing factors to electrical abnormalities in CKD patients.

However, the ECG's interest in the CKD balance sheet is not limited to the search for a LAH. It also eliminates other abnormalities (conduction, excitability, rhythm disorders, etc.) that are often sub-clinical, making it essential for the therapeutic strategy and follow-up of the CKD patient.

Valvulopathies including mitral, aortic and tricuspid diseases accounted for 49.99%, dilated cardiomyopathy and LAH were the most dominant in our patients (**Table 3**). These main morphological abnormalities are also those found in the literature at varying frequencies. In Morocco Ezziani M *et al.* [12] found valvulopathies (80%), LAH (56%) and dilated cardiomyopathy (12%).

Study difficulties: The absence of certain examinations such as coronary artery and angioscanner (technical bias) and the high cost of available examinations that did not allow all patients to do them (selection bias) were our difficulties. However, the study identified the prevalence of complications.

5. Conclusion

Cardiovascular complications are common during chronic kidney failure. They were dominated by enlarged left ventricle, valvulopathies and dilated cardiomyopathy. A much more in-depth study would help to better diagnose and improve the management of cardiovascular complications.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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