

Cardiac Abnormalities in Patients with End-Stage Chronic Kidney Disease

I. ABSTRACT

Among the main causes of mortality and morbidity in chronic hemodialysis patients, cardiac involvement ranks first, thus echocardiography is the diagnostic examination of choice. The aim of our study is to describe the various cardiac lesions on transthoracic echocardiography and to identify the risk factors. Monocentric cross-sectional study including adult patients on hemodialysis for more than a year and having benefited from transthoracic echocardiography during the year 2021 at the Casablanca University Hospital. Our descriptive and analytical study focused on the analysis of demographic, clinical, biological and echocardiographic data. 65 hemodialysis patients were collected, 33 men (50.7%) and 32 women (49.3%), a sex ratio M/F of 1.02. The average age of the patients was 45.45 years \pm 14.29 [18.82] the average seniority in hemodialysis was 15.65 \pm 9.445 years [1.34] 47.7% of patients were hypertensive (n=31) 58.5% of patients were anemic (n=38) and hyperparathyroidism in 46.2% of cases (n=30). The echocardiographic abnormalities found were dominated by left ventricular hypertrophy (LVH) in 67.7% of patients (n=44) and valvulopathies in 66.2% (n=43). Valvular calcifications were noted in 12.3% of cases (n=8), pericarditis in 6.2% of cases (n=4) and dilatation of the left ventricle in 3.1% (n=2). Echocardiography remains the most common examination due to its non-invasive nature, making it possible to make an accurate diagnosis of cardiac abnormalities and to assess the cardiovascular risk.

Key word: Hemodialysis, Echocardiography, Chronic Kidney Disease.

II. INTRODUCTION

Among the main causes of mortality and morbidity in chronic hemodialysis patients, cardiac involvement ranks first, thus echocardiography is the diagnostic examination of choice. The frequency of cardiac involvement in chronic hemodialysis patients depends on several risk factors which may be intertwined, namely arterial hypertension, anemia, chronic inflammation, hyperparathyroidism and many others. In addition, intensive treatment of the risk factors of LVH allows a clear regression of the mass of the left ventricle and therefore reduces all causes of cardiovascular mortality.

The aim of our study is to describe the various cardiac lesions on transthoracic echocardiography and to identify the risk factors.

III. METHODS

Monocentric cross-sectional study including adult patients on hemodialysis for more than a year and having benefited from transthoracic echocardiography during the year 2021. For each of our patients, we analyzed the demographic, clinical, biological and echocardiographic. The clinical data were collected from the patients' records and include: age at the time of the study, sex, duration of hemodialysis expressed in months, initial nephropathy, systolic (SBP) and diastolic blood pressure (PAD), the characteristics of the vascular approach.

IV. RESULTS

IV.1 Demographics :

65 hemodialysis patients were collected, 33 men (50.7%) and 32 women (49.3%), a sex ratio M/F of 1.02. 95,6% patients having 4-hour HD sessions per week. The average age of the patients was 45.45 years \pm 14.29 [18.82] the average seniority in hemodialysis was 15.65 \pm 9.445 years [1.34]

IV.2 Causative nephropathy

Undetermined nephropathy was present in 35 patients, accounting for 51.5% of the total sample. Diabetic nephropathy was observed in 4 patients, representing 5.9% of the sample. Chronic glomerulonephritis was present in 8 patients, accounting for 11.8% of the cohort. Lupus nephropathy was observed in 5 patients, representing 7.35% of the total sample. (Table 1)

Causative nephropathy	Number of patients	Pourcentage
Undetermined nephropathy	35	51,5%
Diabetic nephropathy	4	5,9%
Chronic glomerulonephritis	8	11.8%
Lupus nephropathy	5	7,35%

Table 1 : Causative nephropathy

IV.3 Comorbidity

47.7% of patients were hypertensive (n=31) 58.5% of patients were anemic (n=38) and hyperparathyroidism in 46.2% of cases (n=30).

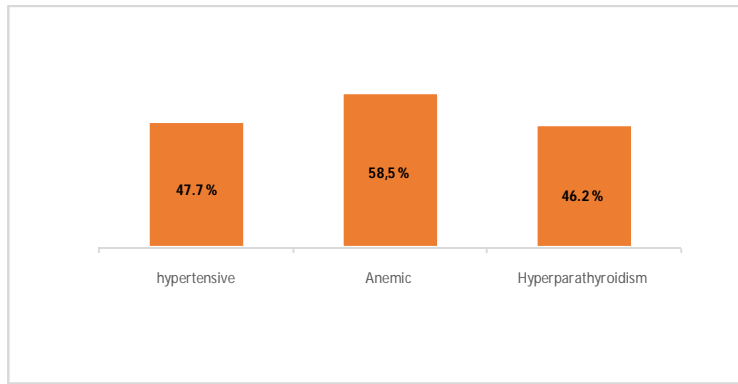


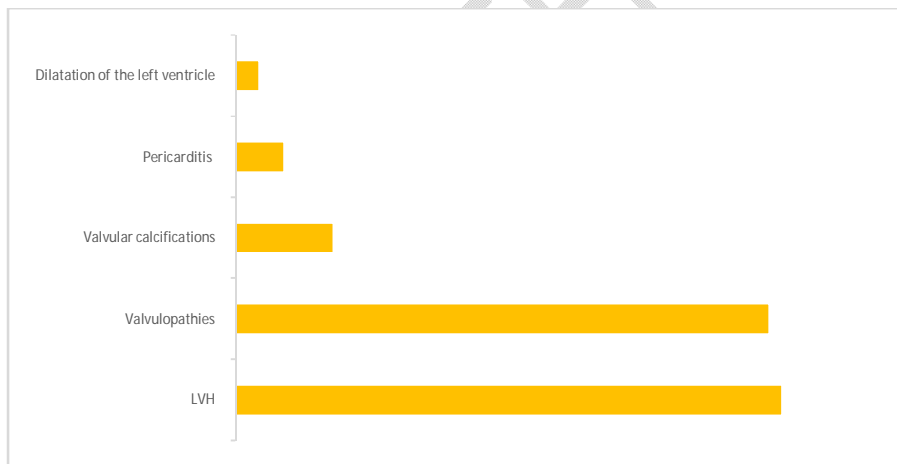
Figure 1 : Comorbidity

IV.4 The echocardiographic abnormalities

The echocardiographic abnormalities found were dominated by left ventricular hypertrophy (LVH) in 67.7% of patients (n=44) and valvulopathies in 66.2% (n=43). Valvular calcifications were noted in 12.3% of cases (n=8), pericarditis in 6.2% of cases (n=4) and dilatation of the left ventricle in 3.1% (n=2).

Statistical analysis of variance of the different anomalies shows that left ventricular hypertrophy is positively correlated with arterial hypertension (p = 0.0001).

Fig .2 Variance of the different anomalies



V. DISCUSSION

Heart conditions are a significant contributor to morbidity and mortality among patients with chronic kidney disease undergoing dialysis treatment. Extensive research has shown a high prevalence of left ventricular hypertrophy (LVH) in this population. In the London series, LVH was found in 75% of the patients [2], while the Foley series reported a prevalence of 73.9% [3]. Our own series aligns with these findings, revealing a prevalence of LVH at 67.7%.

The increased frequency of heart disease in chronic hemodialysis patients can be attributed to various risk factors that are specific to this population. These factors include hypertension, arteriovenous fistula, anemia, and fluid and sodium retention. In our series, similar to several other studies [4], we observed a notable association between the presence of systolic or diastolic arterial hypertension and the development of LVH in chronic hemodialysis patients.

The presence of hypertension, particularly in the context of chronic hemodialysis, poses a significant risk for LVH. Elevated blood pressure levels and prolonged exposure to volume overload contribute to cardiac remodeling and the thickening of the left ventricular wall. Furthermore, the presence of arteriovenous fistula, a common access point for hemodialysis, can lead to changes in hemodynamics and contribute to the development of LVH.

It is essential to recognize these risk factors and their implications in order to effectively manage and prevent cardiac complications in patients with chronic kidney disease on hemodialysis. Close monitoring of blood pressure levels, optimization of fluid balance, and early intervention for hypertension are crucial in mitigating the risk of LVH and improving cardiovascular outcomes in this patient population.

VI. CONCLUSION

Echocardiography remains the most commonly used diagnostic tool due to its non-invasive nature, enabling accurate detection of cardiac abnormalities and assessment of cardiovascular risk.

Overall, the non-invasive nature of echocardiography, combined with its ability to provide detailed and precise diagnostic information, makes it an indispensable tool in modern cardiology. Its widespread use allows healthcare professionals to promptly identify cardiac abnormalities, initiate appropriate treatment strategies, and monitor patients' cardiovascular health over time.

VII. REFERENCES

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