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Pulmonary Edema in Hypertensive Patients with Diastolic Heart Dysfunction: About 200 Cases

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Abstract **Original Research Article**

High blood pressure or hypertension is a public health problem and a common comorbidity in patients with heart failure. It remains a cause of impaired diastolic function, increased afterload of the left ventricle and the progression of atherosclerotic lesions. In addition to myocardial dysfunction, various aggravating factors favor pulmonary edema. The aim of our work is to study the frequency of these factors in patients with acute heart failure with conserved systolic function. Echocardiography shows hypertrophic cardiomyopathy in 80 patients (40%), ischemic heart disease with a preserved ejection fraction in 40 patients (20%), and valvulopathy in 40 patients (20%). A dilated left atrium is identified in 115 patients (57.5%). The average ejection fraction quantified according to the Simpson biplane method is 60 ± 10%. A diastolic relaxation type defined by an Em / Am ratio of less than one with a deceleration time or TD of more than 150 ms is observed in 92 pts (46%. Hypertensive patients referred for pulmonary edema are often obese, dyslipidemic and smoking. They have echocardiography heart failure with a preserved ejection fraction. Poor prognostic factors are linked to acute renal failure. Rigorous monitoring of these patients with control of blood pressure figures is necessary.

Keywords: Hypertension; heart failure; preserved ejection fraction; prognostic factors.

INTRODUCTION

High blood pressure or hypertension is a public health problem and a common comorbidity in patients with heart failure. It remains a cause of impaired diastolic function, increased afterload of the left ventricle and the progression of atherosclerotic lesions. The control of blood pressure figures allows optimal management of these patients [1]. In addition to myocardial dysfunction, various aggravating factors favor pulmonary edema. The aim of our work is to study the frequency of these factors in patients with acute heart failure with conserved systolic function.

PATIENTS AND METHODS

In a retrospective study from December 2017 to January 2020, two hundred hypertensive patients were admitted for acute heart failure with preserved ejection fraction, and followed for two years in a day hospital unit at the Khénifra provincial hospital center in Morocco. The majority of these patients are on medical treatment. The control of blood pressure is judged on the data of the home self-measurement of cases and the measurements obtained during hospitalization. The presence of comorbidities including diabetes and atrial fibrillation, as well as socio-demographic data are identified. Echocardiography is performed according to the recommendations of American and European societies. It relates to the evaluation of the systolic function of the left ventricle, by measuring the ejection fraction (or FE) using the Simpson biplane method, and of the diastolic function by estimating the filling pressures of the ventricle. left (or PRVG). These are assessed using the Pulsed Doppler Echocardiography and Tissue Doppler Imaging (or DTI) examination.

RESULTS

Our study involved 200 hypertensive patients followed in the heart failure unit. The average age is 62.9 years ± 12 years. There are 122 men and 78 women. Half of our sample has grade III hypertension, 60 patients (30%) grade I hypertension.

The body mass index or BMI is greater than 30 kg / m2 and present in 75 patients (37.5%). Waist circumference is greater than 100 cm in men and 80 cm in women, found in 180 patients (90%).

Diabetes is associated with high blood pressure in 63 patients (31.5%). Dyslipidemia was found in 85 patients (42.5%). A notion of active or weaned smoking is reported in 82 of the patients (41%).

78 patients (39%) have had a history of ischemic stroke. In addition, a hemorrhagic stroke was reported in 14 cases.

The electrocardiogram is used for atrial fibrillation in 65 of the cases (32.5%). A left branch block was observed in 11 patients (5.5%), and an electric left ventricular enlargement was noted in 27 cases (13.5%).

Echocardiography shows hypertrophic cardiomyopathy in 80 patients (40%), ischemic heart disease with a preserved ejection fraction in 40 patients (20%), and valvulopathy in 40 patients (20%). A dilated left atrium is identified in 115 patients (57.5%). The average ejection fraction quantified according to the Simpson biplane method is 60 ± 10%. A diastolic relaxation type defined by an Em / Am ratio of less than one with a deceleration time or TD of more than 150 ms is observed in 92 pts (46%). An increase in LV filling pressures with the following parameters: Em / e '> 8 and Ap> Am is observed in 60 patients, ie a rate of 30%. A pseudonormal diastolic profile (1 <Em <2) with a deceleration time <150 ms is noted in 75 patients (i.e. 37.5%). A restrictive type profile (Em / Am> 2) with a TD <100 ms in 40 patients (i.e. 20%).

Biologically, renal failure was found in 32 of the cases. Anemia was noted in 13 patients (6.5%).

Eighty patients (40%) in our series have a balanced blood pressure under dual therapy and 30% of cases with triple therapy. Diuretics are prescribed in all patients, beta-blockers in 80%, ACE inhibitors in 75%, and renin receptor antagonists in 7.5% of cases. Dietary and hygienic measures are observed in 35% of patients. During the one-year follow-up, 36 patients died from severe pulmonary edema with end-stage renal disease.

DISCUSSION

Heart failure is conventionally associated with impaired contractility, impaired systolic function, with a significant reduction in the ejection fraction and cardiac dilation. In some studies, cases admitted for heart failure present a preserved systolic function of the left ventricle of more than 45% with anomalies of the ventricular filling [4].

Our study concerns a population of 200 cases hospitalized for an acute episode of pulmonary edema. They are hypertensive with echocardiographic exploration, a preserved ejection fraction and high filling pressures. Admittedly, this rate of 45% is lower than that of heart failure by systolic dysfunction estimated at 55% of the reasons for admission for an attack of heart failure, but it remains comparable to the data in the literature [5, 6].

The clinical picture of heart failure with altered left ventricle ejection fraction depends essentially on the severity of the systolic dysfunction [2]. Conversely, when heart failure is attributed to diastolic dysfunction of the left ventricle, clinical manifestations and natural history are linked to associated comorbidities. This update emphasizes the multifactorial pathogenesis of heart failure syndrome associated with diastolic dysfunction which has recently been designated as a preserved LV ejection fraction IC (or IC-FEP).

In our work, hypertensive patients admitted to an acute heart failure table had the usual symptoms of pulmonary edema, namely resting dyspnea with ambient air desaturation and crackles in both lung fields. The majority of them are obese, suffering from severe grade III hypertension associated with dyslipidemia.

These results join those described in the national series led by Mr. El Hattaoui at the CHU Mohammed VI in Marrakech [6]. The authors in this series collected 163 hypertensive patients with chronic heart failure among 385, representing a rate of 42%. The average age is 63 ± 11 years with a sex ratio equal to one. Half of this sample is diabetic, 37% are obese, 43% are sedentary and 15% are dyslipidemic.

The same observations are reported by a prospective African observational study conducted in Abidjan [5] between 2004 and 2014, which involved 200 hypertensive patients with an average age of 65 ± 11 years followed for heart failure with ejection fraction preserved in unit of day hospital. One in two patients has diabetes associated with high blood pressure. Dyslipidemia was found in 78 patients, a rate of 39%.

The diagnosis of preserved ejection fraction heart failure or IC-FEP is based on cardiac echo-Doppler and to a lesser extent on biomarkers [4-6]. It is also important to emphasize that this entity is one of the most common causes of pulmonary hypertension.

In the work of EL Hettaoui [5], all the patients are followed in the hospital on the day of heart failure of the CHU Mohamed VI of Marrakech, being hypertensive on diet alone and / or under medical treatment with good therapeutic observance on a 12 month period. 63% of cases were followed for ischemic

heart disease, 11% for dilated heart disease and 5% for valvular heart disease.

In the African study [5], echocardiography revealed concentric left ventricular enlargement in 63% of cases and dilated left atrium in 55% of cases. The average ejection fraction quantified according to the Simpson biplane method is 55 ± 10%. A diastolic profile of relaxation disorder type is observed in 40% of cases, with an increase in LV filling pressures in 56 cases. The pseudonormal diastolic profile is noted in 40% of cases. A restrictive type profile is observed in 40 cases (20%).

These data are comparable to ours, probably due to the presence of a sample of the same number having interested the same age group. A larger study including a larger number of patients is necessary for more conclusive results.

Regarding the prognosis of insufficiency with preserved ejection fraction, it remains comparable to that of systolic IC. The high mortality testifies to the importance of the role of associated comorbidities. High blood pressure, kidney failure, diabetes, obesity and sleep apnea-like sleep abnormalities are the most common comorbidities in IC-FEP. They are responsible for the multiple clinical presentations. Exercise intolerance is largely explained by the vicious circle that exists between hydro-sodium retention dependent on renal failure, the rigidity of the left ventricle and the alteration of the ventriculo-vascular coupling. These comorbidities are frequent in patients with heart failure and significantly alter their prognosis [7].

In the same vein, Jean Paul [4] found that heart failure with preserved systolic function is common in women, has a less severe medium-term prognosis than that of systolic dysfunctions, but a high morbidity with a significant rate of re-hospitalizations for recurrences despite medical treatment. According to this study, a restrictive aspect of the transmitral filling profile has a negative prognostic value.

According to N. Ali-Tatar [5], hypertensive patients with heart failure referred for an echocardiography are often obese, diabetic and present with heart failure with preserved ejection fraction with an increase in filling pressures [5].

For our part, hypertensive patients are often male, obese, dyslipidemic and chronic smoking subjects, with diastolic dysfunction of the left ventricle. Acute renal failure is associated with an increased risk of mortality.

Finally, it should be noted that 40% of our patients have a balanced blood pressure with dual therapy and 30% of cases with triple therapy. Diuretics are prescribed in all patients, beta-blockers in 80%, ACE inhibitors in 75%, and renin receptor antagonists in 7.5% of cases. Dietary and hygienic measures are observed in 35% of patients.

In the Moroccan series [6], the control of blood pressure figures was crucial in the management of heart failure. Being the pillars of the treatment of heart failure, beta-blockers and ACE inhibitors were the most prescribed therapeutic classes.

In the study by Jean Paul [4], ninety percent of the patients were on ACE inhibitors, 37% on beta-blockers, and 36% on nitrates, and all were treated with diuretics in the acute phase. These results seem to agree with ours.

CONCLUSION

Hypertensive patients referred for pulmonary edema are often obese, dyslipidemic and smoking. They have echocardiography heart failure with a preserved ejection fraction. Poor prognostic factors are linked to acute renal failure. Rigorous monitoring of these patients with control of blood pressure figures is necessary.

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