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Cardio Renal Syndrome at the Mohammed VI University Hospital of Marrakech: Epidemiological, Clinical, Therapeutic and Evolutionary Aspects

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Abstract **Original Research Article**

Introduction: Cardiorenal syndrome (CRS) is an entity involving a bidirectional pathophysiological interaction between the heart and the kidneys. This interaction includes either chronic or acute dysfunction of one organ, which could induce chronic or acute dysfunction of the other. It leads to higher morbidity and mortality rates. The aim of this study is to estimate the prevalence of the different types of CRS and identify the main epidemiological, clinical, therapeutic, and prognostic aspects of this syndrome. ***Methods:*** Our study was a retrospective, descriptive, and analytical investigation conducted over three years, including all heart failure patients with impaired renal function who were hospitalized in the cardiology and nephrology departments between January 2021 and January 2024. ***Results:*** Our population included 206 patients, with a male predominance of 60.5%. The average age of our patients was 65 years ± 14. The clinical presentation was characterized by dyspnea (86.4%) and crackles (38.3%). The majority of our patients had preserved diuresis (84,7%). Echocardiography mostly revealed left ventricular systolic dysfunction (78%), and a dilated left ventricle in 49.5% of cases. Normal-sized kidneys were observed in 86% or our patients on ultrasound. Renal replacement therapy was needed in 16% of the cases. Complete recovery of renal function was observed in 40.8% of patients, with an average discharge creatinine level of 20 mg/L. The dominant type of CRS was type 1 (59.2%), with ischemic heart disease (48.5%) as the leading etiology. Thirty-five deaths (17%) were recorded. The use of vasoactive amines was correlated with a higher mortality rate ($p < 0.001$), unlike the need for dialysis and prolonged hospitalization. ***Conclusion:*** Cardiorenal syndrome is a multifaceted condition, often complex to understand. It represents a significant public health issue. Therefore, gaining a deeper understanding of its pathophysiology will enable structured management and lead to better prognosis.

Keywords: Cardiorenal syndrome, dialysis, kidney failure, echocardiography, cardiac insufficiency, CKD, kidney injury.

INTRODUCTION

Cardio-renal syndrome (CRS) is an entity involving a bi-directional pathophysiological interaction between the heart and the kidneys. The latter encompasses chronic or acute dysfunction of one that could induce chronic or acute dysfunction of the other. It can lead to higher morbi-mortality rate. In this work, our aim was to estimate the prevalence of the different types of CRS and to identify the main epidemiological, clinical, therapeutic and prognostic aspects of this syndrome.

METHODS

Our work consisted of a three-year retrospective descriptive and analytical study including all heart failure patients with renal failure hospitalized in the cardiology and nephrology department between January 2021 and January 2024.

The data collected were entered and recorded on Excel 2016 and analyzed with SPSS version 23 statistical software at the clinical research department of the Faculty of Medicine and Pharmacy in Marrakech.

The study included a descriptive analysis as well as a bi-variate analysis.

A p value < 0.05 was considered statistically significant in the analysis.

RESULTS

Our population comprised 206 patients. There was a predominance of males (60.5%). The mean age of our patients was 65 ± 14 years. Past history was dominated by arterial hypertension (48.1%), diabetes (44.7%) and smoking (35%). The clinical symptomatology was marked by dyspnea (86.4%) and crackles (38.3%). Diuresis was preserved in 84.7% of our patients. Biologically, CRP was elevated in 82% of cases. Anemia was noted in 34.4% of our patients. Echocardiography revealed LV systolic dysfunction in the majority of cases (78%), PAH (51.5%) and elevated LV filling pressure (53.4%), as well as dilated VC in 49.5% of cases. 86% of our patients had normal-sized kidneys on ultrasound. 16% needed dialysis. Total recovery of renal function was observed in 40.8% of patients. The predominant type of CRS was type 1 (59.2%), with ischemic heart disease as the etiology (48.5%). Thirty-five deaths (17%) were recorded.

The use of vasoactive amines was correlated with higher mortality ($p<0.001$), in contrast to the need for dialysis and prolonged hospital stay.

DISCUSSON

According to the recent definition proposed by the Consensus conference on Acute Dialysis Quality Initiative Group [1], the term cardio-renal syndrome (CRS) has been used to define different clinical conditions in which heart and kidney dysfunction overlap [2].

The following chapter reveals the pathogenesis of the different types of CRS.

Type 1 Cardio Renal Syndrome

Type 1 CRS occurs in about 25% of patients hospitalized for acute decompensated heart failure (ADHF) [3]. It is characterized by acute impairment of cardiac function leading to acute renal dysfunction.

Type 2 Cardio-Renal Syndrome

Type 2 cardio-renal syndrome includes chronic abnormalities of cardiac function leading to chronic renal dysfunction. The cardiac abnormalities are frequently chronic heart failure, constrictive pericarditis and ischemic cardiomyopathy. CKD has been observed in 45-63% of CHF patient [4, 5], but it's unclear how to classify these patients often including those ones shifting from a clinical condition of Type 1 CRS.

Type-3 Cardiorenal Syndrome

Type 3 cardio-renal or reno-cardiac syndrome is characterized by acute impairment of renal function, leading to acute cardiac dysfunction.

Of renal function leading to acute cardiac dysfunction. The etiologies include contrast-associated AKI, cardiac surgery, post-infectious glomerulonephritis, rhabdomyolysis.

Type-4 Cardio Renal Syndrome

SCR type 4 corresponds to primary chronic renal failure responsible for secondary secondary chronic cardiac dysfunction (cardiac remodeling, LV diastolic dysfunction dysfunction, left ventricular hypertrophy)

It's well established that renal dysfunction is an independent risk factor for cardiovascular disease with higher mortality risk for myocardial infection and sudden death in CKD [6].

Type-5 Cardio Renal Syndrome

Type 5 CRS is characterized by the association of renal failure and cardiac insufficiency cardiac failure secondary to acute or chronic systemic pathology.

The predominant causes are sepsis, but also diabetes, autoimmune diseases and amyloidosis.

CONCLUSION

Cardio-renal syndrome is a polymorphous condition that is often complex to understand. It represents a real public health problem.

Acquiring a thorough understanding of its pathophysiology will help us to achieve a better prognosis and more effective management.

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