Scientific Research Publishing

World Journal of Cardiovascular Diseases, 2023, 13, 189-197
https://www.scirp.org/journal/wjcd
ISSN Online: 2164-5337
ISSN Print: 2164-5329

Cardio-Renal Syndrome: Epidemiological, Clinical, Paraclinical, Etiological Aspects and Prognostic Factors in the Cardiology Department of the CHU Ignace Deen in Conakry

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How to cite this paper: Sory, B.I., Foussény, D., Fatoumata, F., Yaya, B.E.H., Mariama, B.M.B., Mariam, B., Morlaye, S., Abdoulaye, C., Aly, S., Diarra, K., Kokoulo, K., Salématou, D. and Dadhi, B.M. (2023) Cardio-Renal Syndrome: Epidemiological, Clinical, Paraclinical, Etiological Aspects and Prognostic Factors in the Cardiology Department of the CHU Ignace Deen in Conakry. *World Journal of Cardiovascular Diseases*, **13**, 189-197.
https://doi.org/10.4236/wjcd.2023.134015

Received: February 17, 2023
Accepted: April 8, 2023
Published: April 11, 2023

Abstract

Introduction: Heart and kidney diseases are common among patients admitted to hospital and they coexist in a significant number of cases. The interactions between the cardiovascular system and the kidney have been known and described for many years and have led to the description of cardio-renal syndrome. The objective of this study was to determine the frequency; to describe the clinical, etiological and prognostic aspects of acute renal failure in patients hospitalized for chronic congestive heart failure. **Method:** This was a descriptive retrospective study from January 2, 2018 to December 31, 2022. Included in this study were all the complete records of patients hospitalized for chronic congestive heart failure with serum creatinine ≥120 µmol/I. We're not included in this study, incomplete files, records of patients hospitalized for other pathologies, records of patients hospitalized for chronic congestive heart failure with normal renal function. Our study variables were qualitative and quantitative divided into clinical, paraclinical and prognostic data. Our data were analyzed using the EPI-info 7.2.2.6 software. Data entry and presentation were carried out using Word, Excel and PowerPoint from the 2016 Office Pack. **Results:** We collected 830 files of which 114 met our selection criteria, a frequency of 13.73%. The mean age of the patients was 47 ± 19 years. The F/M sex ratio was 1.23. The dominant etiologies were hypertension followed by diabetes with respectively 60.5% and 23.7%. Toxic factors including tobacco accounted for 7.9% of cases. Dyspnea accounted for 86.8%. Most of our patients were grade 3 or 36% based on systolic blood pressure on admission

with an average of 164.16 ± 33.95 mmHg and an average diastolic blood pressure of 93.24 ± 20.40 mmHg. Biologically, the serum creatinine revealed a high frequency of 201 - 400 µmol/l (33% of cases) with an average value of 586.49 ± 631.44 µmol/l with the extremes 2.960 and 2448.68 µmol/I. Anemia was moderate in 34.2% of cases. Cardiac ultrasound was performed on 81 patients, the results of which showed dilated cardiomyopathy in 48.2% of cases. Renal ultrasound was performed only by 18 patients, renal suffering was found with 8.8%. Almost all (92.11%) of the patients had an acute renal failure of functional origin. More than half (65.80%) of our patients were at risk. Diuretics were the most prescribed antihypertensives with 87.71% followed by ACE inhibitors 78.94%. The average length of hospitalization was 13.81 ± 7.66 days with extremes of 24 hours and 41 days. **Conclusion:** The association of acute renal failure and chronic congestive heart failure is a frequent situation. The diagnostic approach must be guided by the context and the data of a meticulous examination supplemented by an appropriate paraclinical assessment. Kidney renal failure is mostly functional.

Keywords

Cardio-Renal Syndrome, Ignace Deen

1. Introduction

Heart and kidney diseases are common in patients admitted to hospital and they coexist in a significant number of cases [1]. The interactions between the cardiovascular system and the kidney have been known and described for many years and have led to the description of the cardio-renal syndrome [2]. The objective of this study was to determine the frequency; to describe the clinical, etiological and prognostic aspects of acute renal failure in patients hospitalized for congestive chronic heart failure.

2. Method

This was a descriptive retrospective study from January 2, 2018 to December 31, 2022. Included in this study were all the complete records of patients hospitalized for chronic congestive heart failure with serum creatinine ≥ 120 µmol/I. We're not included in this study, incomplete files, records of patients hospitalized for other pathologies, records of patients hospitalized for chronic congestive heart failure with normal renal function. Our study variables were qualitative and quantitative divided into clinical, paraclinical and prognostic data. Our data were analyzed using the EPI-info 7.2.2.6 software. Data entry and presentation were carried out using Word, Excel and PowerPoint from the 2016 Office Pack.

3. Results

We collected 830 files of which 114 met our selection criteria, a frequency of 13.73% (**Figure 1**). The mean age of the patients was 47 ± 19 years (**Table 1**).

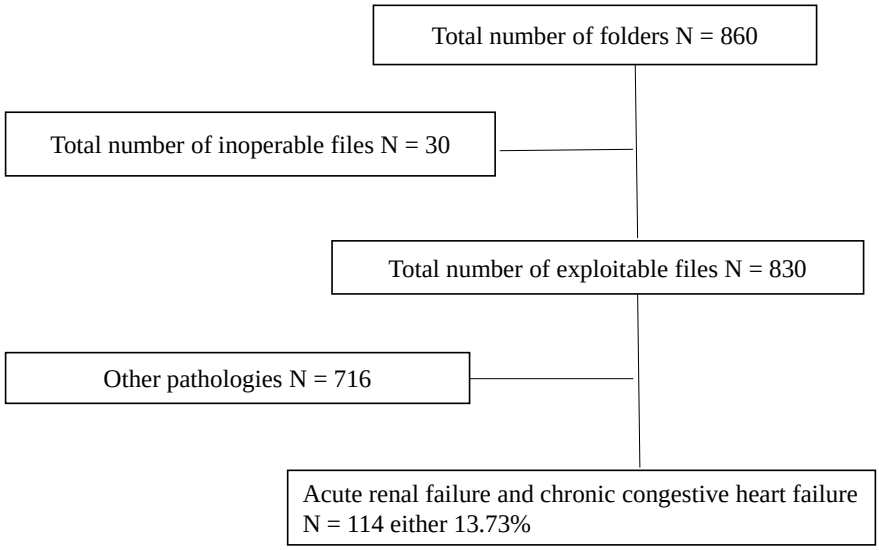

Figure 1. Flow chart of patients hospitalized for cardio-renal syndrome.

Table 1. Breakdown by age group.

Age range (year)	Effective	Percentage
[9 - 19[	6	5.2
[19 - 29[	3	2.6
[29 - 39[	15	13.1
[39 - 49[	15	13.1
[49 - 59[	18	15.7
[59 - 69[	27	23.6
[69 - 79[	21	18.4
[79 - 84[	9	7.8
Total	**114**	**100**

The F/M sex ratio was 1.23. The dominant etiologies were hypertension followed by diabetes with respectively 60.5% and 23.7%. Toxic factors including tobacco accounted for 7.9% of cases. Dyspnea accounted for 86.8%. Most of our patients were grade 3 or 36% based on systolic blood pressure on admission with an average of 164.16 ± 33.95 mmHg and an average diastolic blood pressure of 93.24 ± 20.40 mmHg (Table 2). Biologically, the serum creatinine revealed a high frequency of 201 - 400 µmol/l (33% of cases) with an average value of 586.49 ± 631.44 µmol/l with the extremes 2.960 and 2448.68 µmol/I. Anemia was moderate in 34.2% of cases. Cardiac ultrasound was performed in 81 patients, the results of which showed dilated cardiomyopathy in 48.2% of cases (Table 3). Renal ultrasound was performed only by 18 patients, renal suffering was found with 8.8%. Almost all (92.11%) of the patients had an acute renal failure of functional origin (Table 4). More than half (65.80%) of our patients were at risk. Diuretics were the most prescribed antihypertensives with 87.71% followed by ACE inhibitors 78.94%. The average length of hospitalization was 13.81 ± 7.66

Table 2. Distribution according to blood pressure.

Arterial pressure	Effective	Percentage
PAS (mmhg)		
<140	31	27.2
140 - 159	9	7.9
160 - 179	33	28.9
≥180	41	36.0
PAD (mmhg)		
< 90	63	55.3
91 - 99	6	5.3
100 - 109	21	18.4
≥110	24	21.1
Total	**114**	**100.0**

Mean PAS: 164.16 ± 33.95 mmHg; Extremes: 90 - 254 mmHg; Mean PAD: 93.24 ± 20.40 mmHg; Extremes: 60 - 146 mmHg.

Table 3. Distribution according to the results of the ultrasounds performed.

Imagery	Effective	Percentage
Cardiac Doppler echo		
Dilated cardiomyopathy	55	48.2
Hypertensive cardiomyopathy	8	7.0
LV relaxation disorder	15	13.2
Pulmonary arterial hypertension	3	2.6
Kidney ultrasound		
Kidney pain	10	8.8
Normal	2	1.8
Small kidney	2	1.8
Hydronephrosis	2	1.8
Tubulointerstitial nephropathy	2	1.8

Table 4. Distribution according to acute renal failure etiology.

Etiology	Effective	Percentage
Acute pre-renal or functional renal failure	105	92.11
Acute renal or organic renal failure	06	5.26
Acute post-renal or obstructive renal failure	3	2.63
Total	**114**	**100**

days with extremes of 24 hours and 41 days. In this study, 68.42% of patients had a favorable outcome (Table 5).

Table 5. Distribution according to evolution.

Evolution	Effective	Percentage
Favorable	78	68.4
Deceased	21	18.4
Transferred	15	13.2
Total	**114**	**100**

4. Discussion

We conducted a descriptive retrospective study of five years on patient files from January 2, 2018 to December 31, 2022 in order to identify the etiological and prognostic factors of acute renal failure in cardiac patients in the Department of Cardiology from the CHU Ignace Deen in Conakry. This study allowed us to identify the etiological and prognostic factors of acute renal failure in chronic congestive heart failure. The low socioeconomic level of our patients as well as the lack of data on the vast majority of the files studied was our main difficulties and limitations.

During this period, we collected 830 files, of which 114 met our selection criteria, a frequency of 13.73% (**Figure 1**). This result is comparable to that reported by Bodian *et al.* [3] in Senegal who obtained a frequency of 3.7%. These results corroborate the data of the literature which stipulate that the ARF is a frequent pathology in cardiac pathology. The age of our patients ranged from 9 to 84 years with an average of 47 ± 19 years with a majority range of 59 - 69 or 23.6% (**Table 1**). This result is slightly different from that of Sinomono *et al.* [4] at the CHU DE BRAZZAVILLE in 2020 who had obtained an average age of 49 years. This result could be explained by the fact that these two diseases affect older people more. The majority of patients were women [63 (55.00%)] with a sex ratio F/M = 1.23. The same observation was made by Benatta *et al.* [5] at the Cardiology Department of the University Hospital of Oran in Algeria in 2018 who reported a predominance of women (57.28%). The strong representation of women in terms of demography could explain this result.

The analysis of the marital status of our patients had shown that the majority of patients were married, 65.8%. In Algeria, Traore [6] in his doctoral thesis in medicine in 2019 noted that married people were the most frequent (83.4%). According to the results of the demographic and health survey (EDS-2018), 46% of Guineans marry between the ages of 20 and 49 [7]. Housewives and civil servants were the most represented socio-professional stratum within the sample with 39.47% and 31.57%. Our data are consistent with those of another African study where Konaté [8] found that his patients were frequent housewives and represented 86.7%. The sedentary lifestyle of women exposes them to heart and kidney diseases. In this study, 2 out of 3 patients lived in urban areas, 68%. This result is similar to that of Konaté [8] in his doctoral thesis in medicine in 2020 in Mali who reported that 73.3% of his patients came from the urban commune of

Bamako. The location of our study setting could justify this result. The presence of comorbidities, such as diabetes, high blood pressure, heart disease, chronic lung disease, and cancer, have been described as risk factors for severe disease that can lead to hospitalization of the patient. In our case, they were dominated by hypertension followed by diabetes respectively 60.5% and 23.7%. This result is similar to that of Bourial *et al.* [9] at the Nephrology Department of the CHU Ibn Rochd in Casablanca who also reported a predominance of hypertension and obesity with 47.4% and 30%. According to the literature, hypertension and diabetes would promote the occurrence of cardio-renal diseases. Toxic factors including tobacco accounted for 7.9% of cases. This result is similar to that of El Ghani [10] in 2016 who had collected smoking in 13 patients, 4.23%. This frequency is similar to that of Ait Ouahman [11] in his study on the management of acute renal failure in the intensive care unit at the Avicenne military hospital in Marrakech, which collected 6.7% of smokers. This is explained by the fact that these practices are frowned upon in our societies. Regarding the reason for consultation, we found that dyspnea was mostly (86.8%) found in our patients. This result is consistent with that of Manga *et al.* [12] in 2020 in Senegal who reported that dyspnea was the main reason for consultation in the majority of cases with a frequency of 94.40%. The high frequency of dyspnea reflects the advanced stage of heart failure. Most of our patients were at grade 3 or 36% based on systolic blood pressure on admission with an average of 164.16 ± 33.95 mmHg and an average diastolic blood pressure of 93.24 ± 20.40 mmHg (**Table 2**). A study on the loss of GSTM1 associated with renal failure and heart failure conducted by Tin *et al.* [13] in 2021 noticed a 53% increase in blood pressure in these patients. This confirms the increase in the frequency of this disease in our society. In the majority of cases, the majority of patients had a heart rate that was between 50 - 100 beats per minute with a mean of 96.80 ± 22.37 beats per minute and extremes of 60 and 200 beats per minute.

Biologically, the serum creatinine revealed a high frequency of 201 - 400 µmol/l (33%) with an average value of 586.49 ± 631.44 µmol/l with extremes of 2.960 and 2448.68 µmol/l. The cholesterol level was high in 12 patients (HDL: 10.5%) and 6 patients (LDL: 5.3%); urea < 100 mmol/L in 33 patients (28.9%); blood sugar < 0.70 in 12 patients (10.5%), negative HIV serology in 15 patients (13.2%) and anemia considered moderate in 34.2% of cases. A study of worsening kidney function in a UK national heart failure community setting led by Lawson *et al.* [14] in 2018 observed a mean Cholesterol of 4.6 ± 1.2 mmol/L with a mean level of hemoglobin of 12.9 ± 1.9 g/dL.

The cardiac Doppler echo is a tool that contributes enormously in the diagnostic process of heart failure. In our context, it was performed only by 81 patients whose results showed dilated cardiomyopathy in 48.2% of cases. Exceptionally, renal ultrasound was performed only by 18 patients, renal suffering was found with 8.8% (**Table 3**). This result is similar to that of Samaké [8] in Mali in 2020 in his study, which also found renal suffering of 9.3%. Unlike that of Löfman

et al. [15] in 2015 in Sweden who had observed a predominance of ischemic heart disease with 33%. This low rate of ultrasound examinations is proof of the low socio-economic level of the Guinean population.

Almost all (92.11%) of the patients had an ARF of functional origin. This is due to the increase in self-medication in the general population. The British literature through Lawson *et al.* [14] in 2018 observed that the vast majority of ARIs were of functional origin, 83.24%.

In order to define and stratify the severity of acute renal failure, we used the RIFLE classification (Risk, Injury, Failure, Loss of Renal Function and End Stage Renal Failure) and found that more than half (65.80%) of our respondents was at risk. This corroborates that of Ait Ouahman [11] in Morocco in 2017 who reported a predominance of R with 43.33%.

In our study, diuretics were the most prescribed antihypertensives by doctors with 87.71% followed by ACE inhibitors 78.94%. The same observation was made by Dos Reis *et al.* [16] in 2019 in France, who found that diuretics were the most prescribed drugs in 74.16% of cases.

In this study, 68.42% of patients had a favorable outcome (**Table 5**). The work of Failal *et al.* [17] reported an improvement in 61.35% of patients.

According to patient records, the mean length of hospitalization was 13.81 ± 7.66 days with extremes of one day to 41 days. Von Tokarski *et al.* [18] found that the overall median duration of hospitalization was 24 ± 13 days.

5. Conclusion

The association of acute renal failure and chronic congestive heart failure is a frequent situation. The diagnostic approach must be guided by the context and the data of a meticulous examination supplemented by an appropriate paraclinical assessment. Kidney renal failure is mostly functional.

Conflicts of Interest

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

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