

TO STUDY THE PREVALENCE OF TYPE 1 CRS AMONG HEART FAILURE PATIENTSDharam Dev¹ and Ashish Kumar^{2*}¹M.S General Surgery Health Block Bagsaid Mandi.²M.D Medicine Civil Hospital Jawali, Kangra.***Corresponding Author: Dr. Ashish Kumar**

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ABSTRACT

Background: Patients of cardiorenal syndrome type 1 had comparatively higher mortality and morbidity among different types of CRS. Aim of this study is to determine the prevalence of type 1 CRS among heart failure patients. **Material and Methods:** Total 92 patients of acute heart failure were included in the study. The clinical and laboratory profile and course in hospital were documented. **Results:** Cardiorenal Syndrome Type 1 was present in 16.3% patients. In our study, out of 15 CRS1 patients, 9(60%) were females and 6(40%) were males. Whereas other studies showed predominantly male sex involvement in CRS1. Highest number of patients 23 each (25.00%) were in two age group of 51-60 and 61-70 years. At presentation the main underlying predisposing factors for acute heart failure in patients were DCMP in 4.34%. **Conclusion:** The patients of Type 1 Cardio renal syndrome are seen predominantly in females and elderly populations. Most of the patients have stage 1 AKI and therefore recovered completely.

KEYWORDS: Cardiorenal syndrome, non cardiorenal syndrome, acute kidney injury, dilated cardiomyopathy, acute heart failure.

INTRODUCTION

Cardiorenal syndrome type 1 (CRS1) is a syndrome characterized by a rapid worsening of cardiac function leading to acute kidney injury (AKI), causing high mortality rates, substantial loss in quality of life and high healthcare cost. Robert Brightin 1836 first described interdependent relationship between the kidney and the heart by outlining the significant cardiac structural changes seen in patients with advanced kidney disease. This was further grouped into 5 subtypes according to the temporal sequence of organ failure as well as the clinical context.

Type 1 CRS (Acute CRS): HF resulting in AKI. Example -ACS resulting in cardiogenic shock and AKI, AHF resulting in AKI.

Type 2 CRS (Chronic CRS): Chronic HF resulting in CKD.

Type 3 CRS (Acute renocardiac syndrome): AKI resulting in AHF. Example- HF in the setting of AKI from volume overload, inflammatory surge, and metabolic disturbances in uremia.

Type 4 CRS (Chronic renocardiac syndrome): CKD resulting in chronic HF. Example- LVH and HF from CKD-associated cardiomyopathy.

Type 5 CRS (Secondary CRS): Systemic process resulting in HF and kidney failure. Example- Amyloidosis, sepsis, cirrhosis

However, in clinical practice, identifying the initial insult and subsequent events that result in decompensated acute or chronic CRS/renocardiac syndrome can be challenging.

Inadequate renal afferent flow activates the RAAS axis, the sympathetic nervous system, and arginine vasopressin secretion, leading to fluid retention, increased preload and worsening pump failure. The RIFLE and AKIN classifications can detect AKI with high sensitivity and specificity, while establishing different severity levels to predict the prognosis of affected patients. Incidence estimates for AKI associated with ACS and ADHF range from 9 to 19% and from 20 to 45%, respectively. It is of critical significance to determine the incidence of and outcomes associated with CRS for understanding the overall burden of the disease as well as its natural history, morbidity, and mortality. The spectrum of acute cardiac events that may contribute to AKI includes acute decompensated heart failure (ADHF), acute coronary syndrome (ACS), cardiogenic shock, and surgery-associated low cardiac output syndrome.

AIM AND OBJECTIVES

Aim of this cross sectional observational study is to determine the prevalence of type 1 CRS among heart failure patients.

MATERIAL AND METHODS

It was cross sectional observational study constitutes all the consecutive patients admitted with AHF in Department of Medicine in Indira Gandhi Medical College, Shimla (H.P.) from 1st July 2018 to 30th June 2019.

Cardiorenal syndrome type 1 (CRS1) is a syndrome characterized by a rapid worsening of cardiac function leading to acute kidney injury (AKI).

Framingham criteria for diagnosis of heart failure

- Major Criteria: PND, JVD, Rales, Cardiomegaly, Acute Pulmonary Edema, S3 Gallop, Positive hepatic Jugular reflex, \uparrow venous pressure > 16 cm H₂O.
- Minor Criteria: Lower limb edema, Night cough, Dyspnea on exertion, Hepatomegaly, Pleural effusion, Reduced vital capacity by 1/3 of normal, Tachycardia > 120 bpm, Weight loss 4.5 kg over 5 days management.

AKI assessment was done according to AKIN classification. Stage Serum creatinine criteria:

Stage 1 Increase in serum creatinine of ≥ 0.3 mg/dl (≥ 26.4 mmol/l) or increase to ≥ 150 -200% (1.5- to 2-fold) from baseline within 48 hours.

Stage 2 Increase in serum creatinine to > 200 -300 % (> 2 to 3-fold) from baseline.

Stage 3 Increase in serum creatinine to $> 300\%$ (> 3 fold) from baseline [or S. creatinine. of ≥ 4.0 mg/dl (≥ 354 mmol/l) with an acute increase of at least 0.5 mg/dl (44.21 mmol/l)]

Inclusion criteria

Patients ≥ 18 years old with a diagnosis of AHF.

Exclusion criteria

Patients with known chronic kidney disease. Patients with other risk factors except for AHF that may cause AKI. Patients not willing to give consent.

METHODS

The data regarding clinical profile of patient was collected using pretested self- designed questionnaire including demographic profile, comorbidities. Various laboratory parameters noted including haematological, biochemical, BNP.

Echocardiography was performed in the Department of Cardiology at IGMC Shimla by the cardiologist. The subjects were examined in the supine position and up lateral position with the use of a Philips i33 X-Matrix echocardiography machine. Two dimensional (2-D), Motion mode (M - Mode), Pulsed wave (Pw) Doppler, Continuous wave (Cw) Doppler, Doppler Tissue Imaging (DTI) were performed according to standard protocol. Images were taken according to the guidelines of the American Society of Echocardiography. Parameters as given in the protocol were obtained in all the subjects.

Statistical analysis

Data was entered on Microsoft excel spreadsheet on day to day basis. Results summarized in tables and percentages. The data analyzed using statistical Epi Info software. This study included 92 patients of acute heart failure admitted in Department of Medicine ward in Indira Gandhi Medical College and hospital, Shimla.

OBSERVATIONS AND RESULTS

Prevalence of type 1 cardiorenal syndrome:

In studied population, among total 92 patients of acute heart failure 15 (16.3%) patients had acute kidney injury at admission or during hospital course and hence cardiorenal syndrome Type 1 whereas 77 (83.7%) had no kidney injury and were included in Non cardiorenal syndrome type 1. (Figure 1)

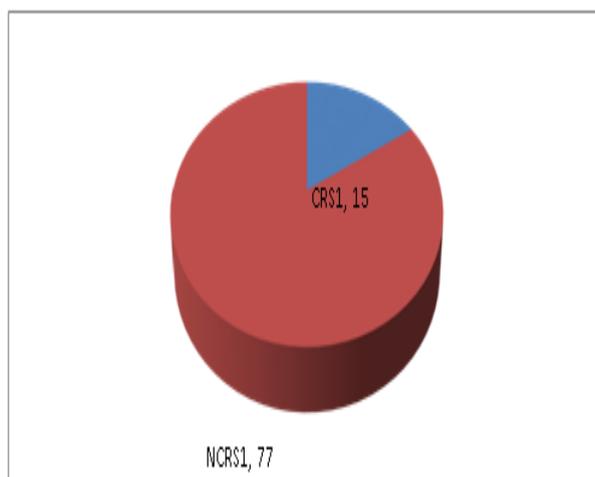


Figure 1: Distribution of patients among CRS1 and NCRS1.

Gender wise prevalence of crs1 among heart failure patients:

Of total 92 patients in the study group, 48 (52%) were females and 44 (48%) were male patients. Female to male ratio was 1.08:1. Out of 15 CRS1 patients, 9 (60%) were females and 6 (40%) were males. This shows that type 1 CRS were predominant in females. (Table 1, Table 2).

Table 1: Gender wise distribution of patients of heart failure patients.

S. No		Frequency (n)	Percentage (%)
1.	Male	44	Fifty two
2.	Female	48	48

Table 2: Gender wise distribution of patients of crs type 1

S. No		Frequency (n)	Percentage (%)
1.	Male	Six	Forty
2.	Female	Nine	Sixty

Age wise prevalence

Among total 92 patients, highest number of patients 23(25.00%) were in two age group of 51-60 and 61-70 years. Eighteen (19.56%) were in the age group 71-80, Eleven (11.95%) in the age group 41-50 and 81-90 each. Five (5.43%) in age group 31-40 and one patient (1.08%) was in 11-20 years age group. It shows that with increase in age prevalence of cardiorenal syndrome also increases. Average age in study population was 63.38±14.47 years. (Table 3, Figure 2)

Table 3: Distribution of the study population by age (n=92)

S. No.	Age group (years)	Frequency (n)	Percentage (%)
1.	18-20	1	1.08
2.	21-30	0	0
3.	31-40	5	19.56
4	41-50	11	11.95
5	51-60	23	25.0
6	61-70	23	25.0
7	71-80	18	19.56
8	81-90	11	11.95

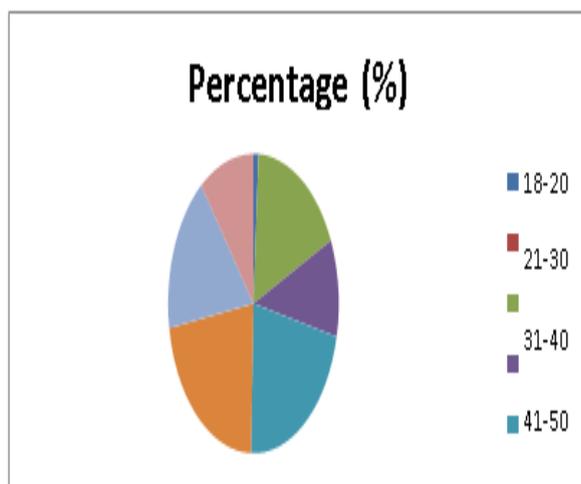


Figure 2: Distribution of study population by age.

Distribution of CRS1 patients as per akin stage

Among patients with CRS1, Eleven (73.3%) patients had AKIN Stage 1 acute kidney injury, Three (20%) patients had AKIN Stage 2 acute kidney injury and 1 (6.7%) patient had AKIN Stage 3 acute kidney injury. (Table 4)

Table 4: Distribution of CRS1 patients by AKIN Stage.

S. no.	Akin stage	Frequency (n)	Percentage (%)
1.	1	11	73.3
2.	2	03	20
3.	3	01	6.7

DISCUSSION

This study constitutes total of 92 patients of acute heart failure, who presented to Department of Medicine at Indira Gandhi Medical College and hospital Shimla. This

study aimed to find out the prevalence of type I Cardio renal syndrome. The prevalence of CRS1 in our study found to be 16.3 %. In study conducted by Gigante A et al on 1,087 patients discharged from their unit during the study period, 190 (17.5%) were diagnosed with CRS and CRS1 prevalence was found to be 32.1%. Most of CRS1 patients in our study were in Stage 1 and recovered completely and discharged. These wide ranges may be attributable to differences in the definitions used to determine worsening renal function and/or ethnic or geographical differences in the selected populations. As the reported incidences of worsening renal function in patients with ACS or ADHF lie on relatively broad limits, further studies with a large sample size are needed to clarify what contribution the AKIN criteria for AKI makes. In our study, out of 15 CRS1 patients, 9(60%) were females and 6(40%) were males. Whereas other studies showed predominantly male sex involvement in CRS1.

Limitations

This study was conducted in a single centre on a small sample size. Dosages of drugs used were not considered in the study. Average duration of hospital stay was less due to limited resources.

CONCLUSION

The incidence of CRS1 was higher in Females as compared to males and occur more in elderly accounting for associated increased comorbidities. The overall prevalence of CRS1 is 16.3 % among various etiologies of acute heart failure. Various medications used for management of heart failure during hospital course do not significantly contribute for development of CRS1.

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