Journal of
Cardiology & Cardiovascular Therapy
ISSN: 2474-7580

Juniper Publishers
key to the Researchers

Research Article
Volume 14 Issue 3 - July 2019
DOI: 10.19080/JOCCT.2019.14.555887

J Cardiol & Cardiovasc Ther

Cardiorenal Syndrome Type I A-A Study of its Incidence, Risk Factors, Laboratory Parameters and Outcome

Bilal Bin Abdullah[1]*, Nida Nausheen[2], Khalid Mehdi[3] and Chirajit Sengupta[3]

[1]*Professor of Medicine, Al Ameen Medical College, India*

[2]*Associate Professor of Pathology, India*

[3]*Senior Resident Medicine, India*

Submission: July 03, 2019; **Published:** July 24, 2019

***Corresponding author:** Bilal Bin Abdullah, Professor of Medicine, Al Ameen Medical College, Vijaypura, India

Abstract

Background: The burden of HF in India appears high and Acute kidney injury is a leading cause of morbidity and mortality. The mechanisms underlying this interaction are complex and multifactorial in nature.

Objective: To know the incidence, risk factors, laboratory parameters and outcome of CRS1 patients.

Methods: a sample size of 100 cases of admitted to Intensive Care Unit in Al Ameen Medical College Hospital in age group between 20 to 80 years. The study period was December 2016 - June2018.

Results: In this study the mean age is 55.3±12.8 years and majority of patients were male (74%) This study shows that in patients of Acute Decompensated Heart failure 47% of the patients had AKI according to RIFLE criterion. Hypertension was the most common pre-existing risk factors (75%) followed by diabetes (44%), smoking (35%), dyslipidemia (30%) and Alcohol (14%). The mean Hb in this study was 11.6882±2.675 g/dl in this study. The total mortality in this study of CRS1 was 7%.

Conclusion: The male predominance, age group 40-50 and 50-60, hypertension, diabetes, smoking and anaemia are risk factors for development of Cardiorenal syndrome type 1 and prompt diagnosis and management reduces morbidity and mortality.

Keywords: Cardiorenal syndrome type 1; Acute decompensated heart failure; Acute kidney injury

Introduction

Heart failure is defined as abnormality of cardiac structure and/or function resulting in clinical symptoms (e.g., dyspnea, fatigue) and signs (e.g., edema, rales), hospitalizations, poor quality of life, and shortened survival [1].

Underlying cardiac disease Includes states that depress systolic ventricular function with reduced ejection fraction (HFrEF; e.g., coronary artery disease [CAD], dilated cardiomyopathies, valvular disease, congenital heart disease); and states of heart failure with preserved ejection fraction (HFpEF; e.g., restrictive cardiomyopathies, hypertrophic cardiomyopathy, fibrosis, endomyocardial disorders), also termed diastolic failure.

Acute precipitating factors for decompensation are excessive Na+ intake, noncompliance with heart failure medications, acute MI (may be silent), exacerbation of hypertension, acute arrhythmias, infections and/or fever, pulmonary embolism, anemia, thyrotoxicosis, pregnancy, acute myocarditis or infective endocarditis, and certain drugs (e.g., nonsteroidal anti-inflammatory agents, verapamil).

AKI complicates 5-7% of acute care hospital admissions and up to 30% of admissions to the intensive care units [1].

Acute kidney injury previously known as acute renal failure is characterized by sudden impairment of kidney function resulting in retention of nitrogenous and other waste products normally cleared by the kidney [1].

It is important to recognize that AKI is a clinical diagnosis and not a structural one. A patient may have AKI without injury to the kidney parenchyma. AKI can range in severity from asymptomatic and transient changes in laboratory parameters

of glomerular filtration rate (GFR), to overwhelming and rapidly fatal derangements in effective circulating volume regulation and electrolyte and acid-base composition of the plasma [1].

All pts with AKI manifests some degree of azotemia (increased blood urea nitrogen [BUN] and Cr). Pts with prerenal azotemia and CHF ("cardiorenal syndrome") may show jugular venous distention, an S3 gallop, and peripheral and pulmonary edema. Therefore, the physical examination is critical in the workup of pts with prerenal AKI [2].

Because there have been no trials specifically in populations with concomitant cardiac and renal dysfunction, the efficacy and safety of CRS therapies cannot be assessed, and evidence-based treatment recommendations cannot be made. Thus, the pharmacologic management of patients with CRS remains a huge challenge [3].

Therefore, the present study was done to study the incidence and identify the risk factors and outcome in patients having Acute Kidney Injury in Acute Decompensated Heart Failure.

Methodology

The present study was observational study carried out at Tertiary Institute to study the incidence. The study period was December 2016 - June2018. A total of 100 patients selected by simple random with signs and symptoms after obtaining clearance from the Ethical Committee of the institute and permission from the appropriate authority.

Inclusion Criteria included all Patients with acute coronary syndrome Patients with acute heart failure and Patients of cardiac surgery. Exclusion Criteria was patients with Valvular heart disease, Pulmonary embolism, Cardiac temponade, Cardiogenic shock, Multi organ failure, Chronic renal failure, Patients on dialysis. The statistical analyses performed using the Statistical Package for Social Science (SPSS) version 2 for Windows.

Results

The above Table 1 and Figure 1 shows distribution of patients according to age. It was observed that majority of patients were in the age group 51-60 years (30%) followed by 41-50 years (27%). The incidence among 61-70 years was 18%, 31-40 was 13%, 71-80 years was 8% and more than 80 years was 4% Calculated mean age is 55.3±12.8 years.

Table 1: Distribution of cases according to age.

Age (Yrs)	N	%
31-40	13	13
41-50	27	27
51-60	30	30
61-70	18	18
71-80	8	8
>80	4	4
Total	100	100

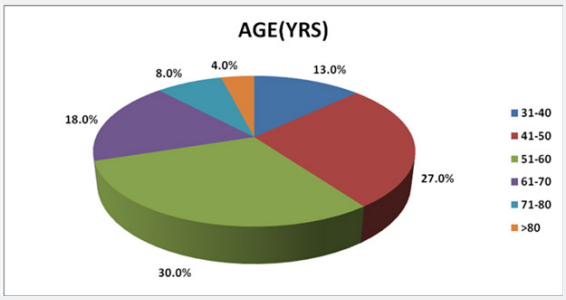

Figure 1: Distribution of cases according to Age.

Table 2:

	Range		Mean	SD
	Min	Max		
Age	32	88	55.3	12.8

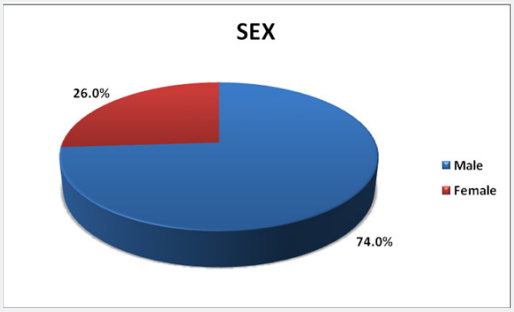

Figure 2: Distribution of cases according to Sex.

The above Table 2 and Figure 2 shows distribution of patients according to sex. It was observed that majority of patients were male (74%) and females were 26%.

Table 3: Distribution of Cases According to Sex.

Sex	N	%
Male	74	74
Female	26	26
Total	100	100

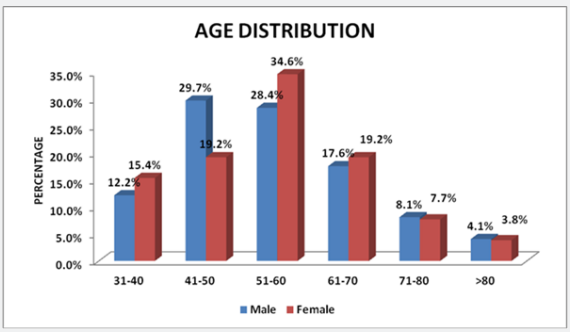

Figure 3: Association of age and sex.

The above Table 3 and Figure 3 shows association of age and sex. It was observed that in age group 51-60 years had more females (34.6%) vs males (28.4%), but in age group 41-50 years males (29.7%) were more than females (19.2%).

How to cite this article: Bilal B A, Nida N, Khalid M, Chirajit S. Cardiorenal Syndrome Type I A-A Study of its Incidence, Risk Factors, Laboratory Parameters and Outcome. J Cardiol & Cardiovasc Ther. 2019; 14(3): 555887. DOI: 10.19080/JOCCT.2019.14.555887

Table 4: Association of Age and Sex.

Age (Yrs)	Male		Female	
	N	%	N	%
31-40	9	12.2%	4	15.4%
41-50	22	29.7%	5	19.2%
51-60	21	28.4%	9	34.6%
61-70	13	17.6%	5	19.2%
71-80	6	8.1%	2	7.7%
>80	3	4.1%	1	3.8%
Total	74	100.0%	26	100.0%

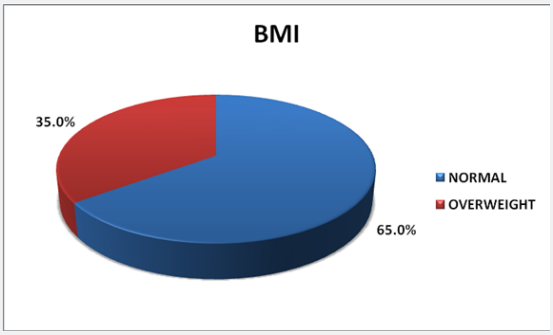

Figure 4: Distribution of cases according to BMI.

The above Table 4 and Figure 4 shows that most of the patients in this study were within normal BMI (65%) vs Overweight (35%). The mean BMI was 24.1±2.0.

Table 5: Distribution of Cases According to BMI.

BMI	N	%
Normal	65	65
Overweight	35	35
Total	100	100

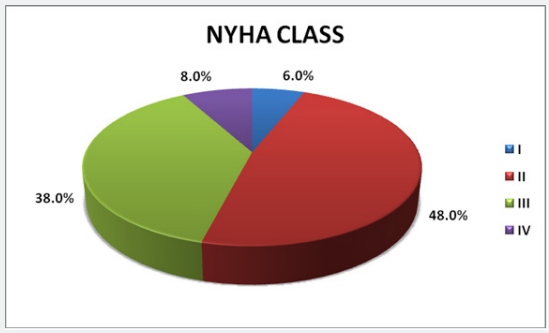

Figure 5: Distribution of cases according to NYHA Class.

The above Table 5 and Figure 5 shows most of the patients were in NYHA Class II (48%), followed by NYHA Class III (38%), NYHA Class IV (8%) and least in NYHA Class I (6%).

Table 6:

	Range		Mean	SD
	Min	Max		
BMI	17.37	30.67	24.1	2.0

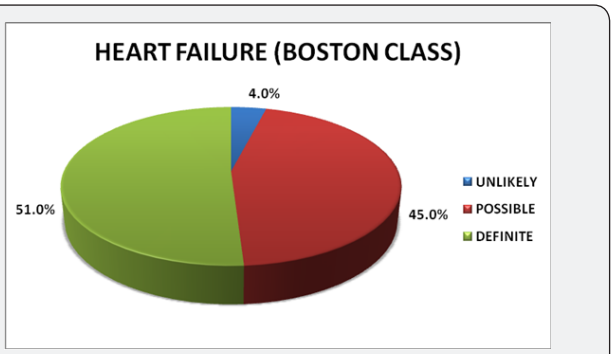

Figure 6: Distribution of cases according to boston classification of Heart Failure.

The above Table 6 and Figure 6 shows that majority of the patients were in Definite Heart Failure (51%) according to Boston Classification Score and Possibly (45%) in heart failure. Only 4% patients were Unlikely to be in Heart failure according to Boston score.

Table 7: Distribution of Cases According to NYHA Class.

Nyha Class	N	%
I	6	6
II	48	48
III	38	38
IV	8	8
Total	100	100

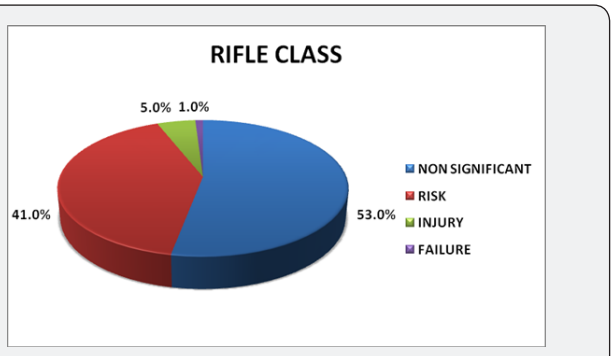

Figure 7: Distribution of cases according to Rifle Class.

The above Table 7 and Figure 7 showed that 53% patients had non-significant renal impairment after acute decompensated heart failure, whereas 41% patients in risk, 5% in injury and 1% in failure according to rifle criteria.

Table 8: Distribution of Cases According to Boston Classification of Heart Failure.

Heart Failure (Boston Class)	N	%
Unlikely	4	4
Possible	45	45
Definite	51	51
Total	100	100

How to cite this article: Bilal B A, Nida N, Khalid M, Chirajit S. Cardiorenal Syndrome Type I A-A Study of its Incidence, Risk Factors, Laboratory Parameters and Outcome. J Cardiol & Cardiovasc Ther. 2019; 14(3): 555887. DOI: 10.19080/JOCCT.2019.14.555887

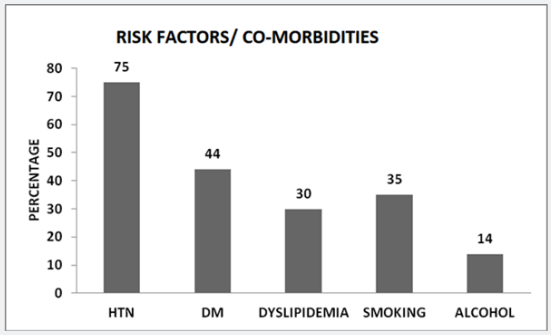

Figure 8: Distribution of cases according to associated Risk Factors/Co-Morbidities.

The above Table 8 and Figure 8 shows that the most common risk factor was hypertension (75%) followed by diabetes (44%), smoking (35%), dyslipidemia (30%) and Alcohol (14%).

Table 9: Distribution of Cases According to Boston Classification of Heart Failure.

Rifle Class	N	%
Non-significant	53	53
Risk	41	41
Injury	5	5
Failure	1	1
Total	100	100

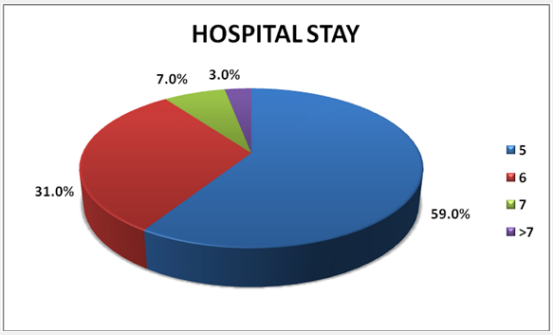

Figure 9: Distribution of cases according to Hospital Stay.

The above Table 9 and Figure 9 shows average hospital stay of 5.6 days. Most of the cases were either discharged or referred to superspeciality centre for further management.

Table 10: Distribution of Cases According to Risk Factors.

Risk Factors/Co-Morbidities	N	%
HTN	75	75
DM	44	44
Dyslipidemia	30	30
Smoking	35	35
Alcohol	14	14

This Table 10 and Figure 10 shows that 61% of the patients were within normal range, 21% of the patients had mild Anemia, 13% had moderate anemia whereas only 5% had severe anemia at the time of presentation according to WHO Criteria for anemia.

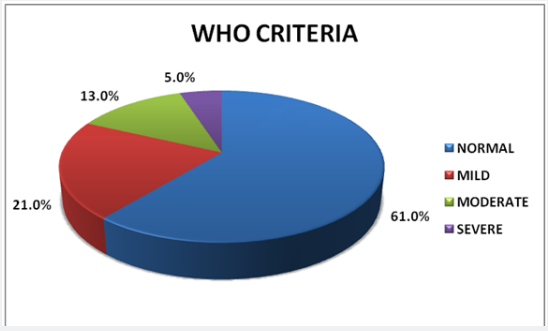

Figure 10: Distribution of cases according to anemia by Who Criteria.

Table 11: Distribution of Cases According to Hospital Stay.

	Range		Mean	SD
	Min	Max		
Hospital Stay	5	10	5.6	1.0

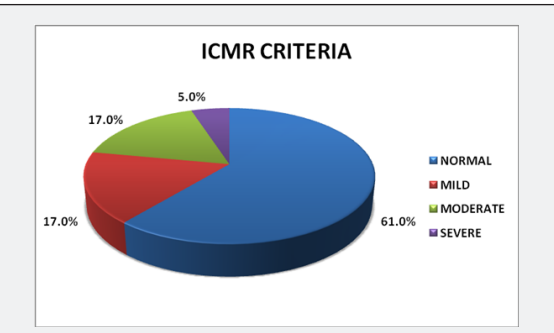

Figure 11: Distribution of cases according to anemia by ICMR Criteria.

This Table 11 and Figure 11 shows that 61% of the patients were within normal range, 21% of the patients had mild Anemia, 13% had moderate anemia whereas only 5% had severe anemia at the time of presentation according to WHO Criteria for anemia.

Table 12: Distribution of Cases According to Anemia by Who Criteria.

Who Criteria	N	%
Normal	61	61
Mild	21	21
Moderate	13	13
Severe	5	5
Total	100	100

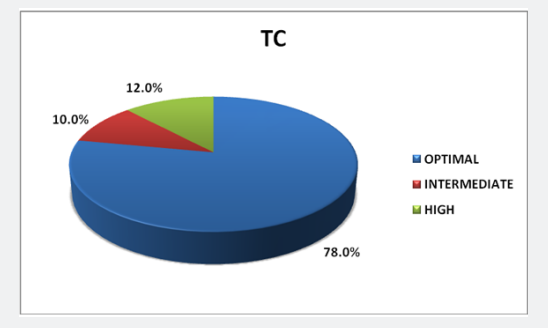

Figure 12: Distribution of cases according to Total Cholesterol.

How to cite this article: Bilal B A, Nida N, Khalid M, Chirajit S. Cardiorenal Syndrome Type I A-A Study of its Incidence, Risk Factors, Laboratory Parameters and Outcome. J Cardiol & Cardiovasc Ther. 2019; 14(3): 555887. DOI: 10.19080/JOCCT.2019.14.555887

This Table 12 and Figure 12 shows that 78% of the patients were in optimal range for total cholesterol, 10% of the patients had intermediate level of total cholesterol, 12% had High cholesterol levels.

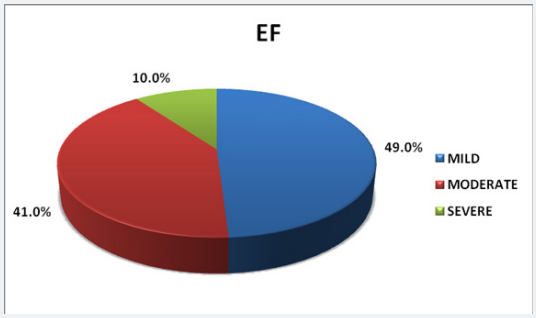

Figure 13: Distribution of cases according to left ventricular Ejection Fraction.

Table 13: Distribution of Cases According to Anemia by ICMR Criteria.

ICMR Criteria	N	%
Normal	61	61
Mild	17	17
Moderate	17	17
Severe	5	5
Total	100	100

This Figure 13 and Table 13 shows that 49% of the patients had mild lv systolic dysfunction whereas 41% patients had moderate lv systolic dysfunction. Only 10% patients had severe lv systolic dysfunction.

Table 14: Distribution of Cases According to Total Cholestrol.

Total Cholesterol	N	%
Optimal	78	78
Intermediate	10	10
High	12	12
Total	100	100

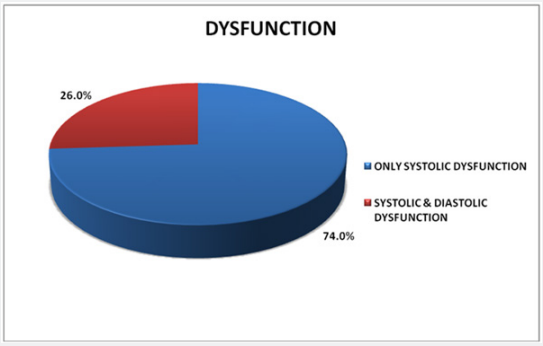

Figure 14: Distribution of cases according to LV Dysfunction.

The above Table 14 and Figure 14 shows that 74% of the patients had only systolic dysfunction whereas 26% of the patients had combined systolic and diastolic dysfunction.

Table 15: Distribution of Cases According to Left Ventricular Ejection Fraction.

EF	N	%
Mild	49	49
Moderate	41	41
Severe	10	10
Total	100	100

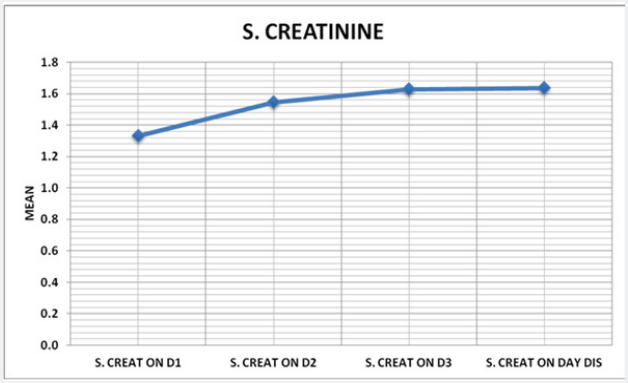

Figure 15: Mean S. Creatinine by days.

The above Table 15 & 16 and Figure 15 show mean creatine on day 1 was 1.3±0.8, mean creatinine on day 2 was 1.5±0.7, mean creatinine was 1.6±0.7 and mean creatinine on day of discharge was 1.6±0.7. The mean s. creatinine clearance was 62.1±25.8.

Table 16: Distribution of Cases According to LV Dysfunction.

Dysfunction	N	%
Only systolic dysfunction	74	74
Systolic & diastolic dysfunction	26	26

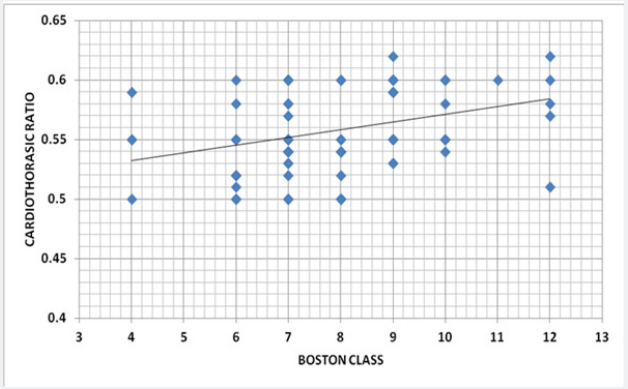

Figure 16: Mean cardiothoracic ratio by correlation of cardiothoracic ratio and Boston Class.

The above Figure 16 shows distribution of patients according to Cardiothoracic ratio. As the Boston score increases so does the increase in cardiothoracic ratio.

The above Table 17 and Figure 17 shows that age groups 41-50 and 61-70 had more possible heart failure patients according to boston classification whereas age groups 51-60, 71-80 and >80 had more definite patients according to boston classification.

How to cite this article: Bilal B A, Nida N, Khalid M, Chirajit S. Cardiorenal Syndrome Type I A-A Study of its Incidence, Risk Factors, Laboratory Parameters and Outcome. J Cardiol & Cardiovasc Ther. 2019; 14(3): 555887. DOI: 10.19080/JOCCT.2019.14.555887

Table 17: Mean S. Creatinine CLR.

S. Creatinine CLR	Range		Mean	SD
	Min	Max		
S. CREAT CLR ON D1	10	122	62.1	25.8

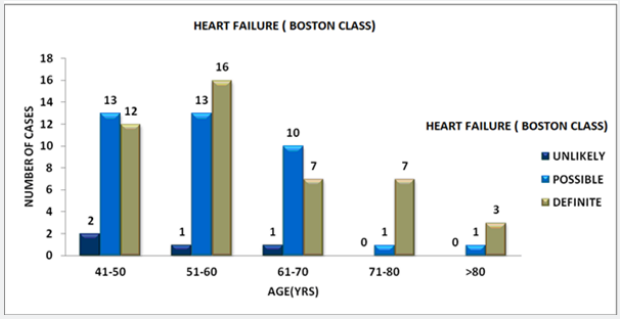

Figure 17: Distribution of age by Boston Classification of Heart Failure.

The above Table 18 and Figure 18 shows that more males (78%) had definite heart failure whereas more females (31%) had possible heart failure according to Boston Classification.

Table 18: Mean Creatinine by Days.

Serum Creatinine	Mean	S.D.
S. Creat on D1	1.3	0.8
S. Creat on D2	1.5	0.7
S. Creat on D3	1.6	0.7
S. Creat on day dis	1.6	0.7

The above table and figure and table show mean creatine on day 1 was 1.3±0.8, mean creatinine on day 2 was 1.5±0.7, mean creatinine was 1.6±0.7 and mean creatinine on day of discharge was 1.6±0.7

The mean s. creatinine clearance was 62.1 ± 25.8

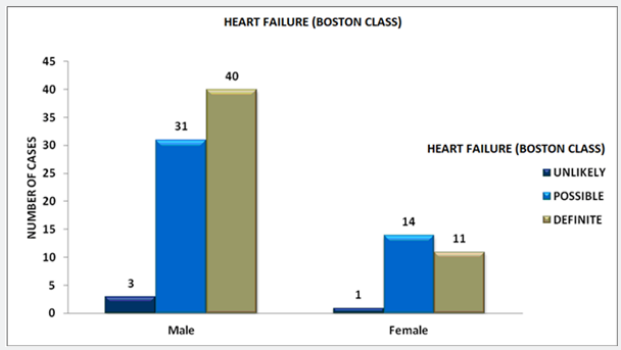

Figure 18: Distribution of sex by Boston Classification of Heart Failure.

This Table 19 and Figure 19 show that 68% of the normal BMI patients were in definite heart failure compared with 31% in overweight patients whereas 60% of normal BMI patients were in possible heart failure compared with 40% in overweight category according to Boston Classification.

This Table 20 and Figure 20 shows that patient's majority of patients in non-significant 51.1% and risk 42.2% categories of rifle class had possible heart failure by boston score, whereas 52.9% non-significant kidney injury and 41.2% risk group of RIFLE criteria had definite heart failure.

Table 19: Distribution of Age by Boston Classification Heart Failure.

Age (yrs)	Heart Failure					
	Unlikely		Possible		Definite	
	N	%	N	%	N	%
41-50	2	50.0%	13	28.9%	12	23.5%
51-60	1	25.0%	13	28.9%	16	31.4%
61-70	1	25.0%	10	22.2%	7	13.7%
71-80	0	0.0%	1	2.2%	7	13.7%
>80	0	0.0%	1	2.2%	3	5.9%
Total	4	100.0%	45	100.0%	51	100.0%

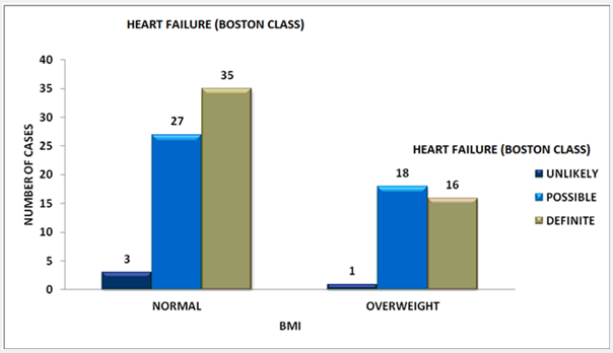

Figure 19: Distribution of BMI by Boston Classification of Heart Failure.

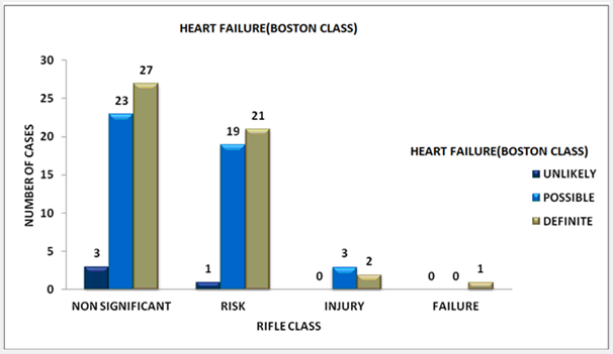

Figure 20: Distribution of patients of rifle class by Boston Classification of Heart Failure.

Table 20: Distribution of Sex by Boston Classification of Heart Failure

Sex	Heart Failure					
	Unlikely		Possible		Definite	
	N	%	N	%	N	%
Male	3	75.0%	31	68.9%	40	78.4%
Female	1	25.0%	14	31.1%	11	21.6%
Total	4	100.0%	45	100.0%	51	100.0%

This Table 21 and Figure 21 shows that 81.8% of possible heart failure patients according to boston score had only systolic dysfunction Vs 18.2% of combined systolic and diastolic dysfunction patients, whereas 62.5% of definite heart failure

How to cite this article: Bilal B A, Nida N, Khalid M, Chirajit S. Cardiorenal Syndrome Type I A-A Study of its Incidence, Risk Factors, Laboratory Parameters and Outcome. J Cardiol & Cardiovasc Ther. 2019; 14(3): 555887. DOI: 10.19080/JOCCT.2019.14.555887

patients according to boston score had systolic dysfunction Vs 37.5 of combined systolic and diastolic dysfunction.

Table 21: Distribution of BMI By Boston Classification of Heart Failure.

BMI	Heart Failure					
	Unlikely		Possible		Definite	
	N	%	N	%	N	%
Normal	3	75.0%	27	60.0%	35	68.6%
Overweight	1	25.0%	18	40.0%	16	31.4%
Total	4	100.0%	45	100.0%	51	100.0%

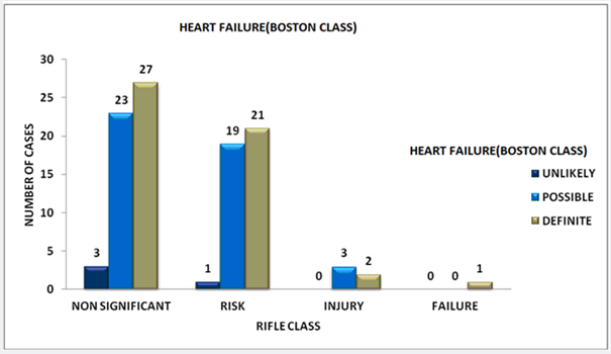

Figure 21: Distribution of patients of LV Dysfunction by Boston Classification of Heart Failure.

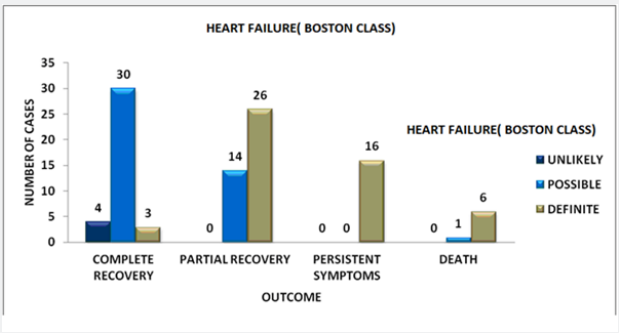

Figure 22: Distribution of outcome by Boston Class of Heart Failure.

Table 22: Distribution of Patients of Rifle Class by Boston Class of Heart Failure.

Rifle Class	Heart Failure					
	Unlikely		Possible		Definite	
	N	%	N	%	N	%
Non-significant	3	75.0%	23	51.1%	27	52.9%
Risk	1	25.0%	19	42.2%	21	41.2%
Injury	0	0.0%	3	6.7%	2	3.9%
Failure	0	0.0%	0	0.0%	1	2.0%
Total	4	100.0%	45	100.0%	51	100.0%

The above Table 22-24 and Figure 22 shows that most of the patient in BOSTON Class of "UNLIKELY" had either recovery, the "POSSIBLE" group of BOSTON class mostly had either complete or partial recovery Whereas the "DEFINITE" group of BOSTON Class that mostly persistent symptoms or Death. The total mortality in this study of CRS1 was 7%.

Table 23: Distribution of Patients of LV Dysfunction by Boston Class of Heart Failure.

Dysfunction	Boston Class of Heart Failure					
	Unlikely		Possible		Definite	
	N	%	N	%	N	%
Only systolic dysfunction	4	80.0%	45	81.8%	25	62.5%
Systolic & diastolic dysfunction	1	20.0%	10	18.2%	15	37.5%
Total	5	100.0%	55	100.0%	40	100.0%

Table 24: Distribution of Outcome by Boston Classification of Heart Failure.

Outcome	Heart Failure					
	Unlikely		Possible		Definite	
	N	%	N	%	N	%
Complete recovery	4	100.0%	30	66.7%	3	5.9%
Partial recovery	0	0.0%	14	31.1%	26	51.0%
Persistent symptoms	0	0.0%	0	0.0%	16	31.4%
Death	0	0.0%	1	2.2%	6	11.8%
Total	4	100.0%	45	100.0%	51	100.0%

Discussion

Cardiorenal syndrome is a term that applies to the pathophysiologic interactions in patients with both cardiac and renal dysfunction. This complex interplay was demonstrated in a 2006 systematic review of >80,000 patients with chronic heart failure, which demonstrated the concurrent existence of moderate-to-severe renal impairment in 29% of this population [4].

CRS occurs frequently in patients with a history of diabetes mellitus and shock at presentation [5]. Diabetes acts through an increased state of systemic generation of reactive oxygen species (ROS) and reactive nitrogen species and heightened inflammation. Excess visceral adiposity is an integral component of the CRS, and is a major contributor to IR, atherogenic dyslipidemia, hyperuricemia, hypertension, albuminuria, and endothelial dysfunction [6].

Anemia is present in over one-third of CRS patients [5]. Cardio-renal anemia syndrome (CRAS) refers to the simultaneous presence of anemia, heart failure, and renal failure, forming a pathologic triad that adversely impacts morbidity and mortality [7]. The prevalence of AKI in patients with ADHF is estimated to be as high as 60% [8].

In patients with acute HF, worsening renal function is frequent, occurring in 11% to 40% of the patients [3,7,9]. Acute HF patients whose renal function worsens during the acute episode have been classified has having type 1 cardio-renal syndrome [10].

How to cite this article: Bilal B A, Nida N, Khalid M, Chirajit S. Cardiorenal Syndrome Type I A-A Study of its Incidence, Risk Factors, Laboratory Parameters and Outcome. J Cardiol & Cardiovasc Ther. 2019; 14(3): 555887. DOI: 10.19080/JOCCT.2019.14.555887

The present observational study was conducted to know the incidence, clinical presentation, laboratory parameters and outcome of acute Kidney injury in patients of Acute decompensated Heart Failuure, the so called CRS1.

The present study was conducted upon 100 cases admitted in Intensive Care Unit in Al Ameen Medical College Hospital with acute Decompensated Heart Failure satisfying the inclusion and exclusion requirements. The duration of study period was from December 2016 to June 2018.

Patients previously diagnosed with valvular heart disease, pulmonary embolism, cardiac tamponade, cardiogenic shock, multi organ failure, chronic renal failure and patients on dialysis were excluded from the study.

A written informed consent was obtained from the participant patient or his/her relatives. The study was approved by the ethical committee of the institute. All the patients were subjected to routine blood investigations and 2D Echocardiography.

Demographic Characteristics

It was observed that majority of patients were in the age group 51-60 years (30%) followed by 41-50 years (27%). The incidence among 61-70 years was 18%, 31-40 was 13%,71-80 years was 8% and more than 80 years was 4%. Calculated mean age is 55.3±12.8 years.

In a study by HR Shah [8] Majority of patients belonged to elderly age group of 61-80 years group. Mean age of males was 64.18±12.95 years and females were 64.64 ± 19.36 years.

Wu et al. [11] in a study of total of 52 patients, which included 27 males and 25 females with showed an average age of 70.7±16.1 years.

Pastori et al. [2] showed the mean age of the 11 patients with CRS1 was 74.0 ± 13.1 years, and 45% of these patients were male.

Zhilian Li et al. [11] showed the mean age of 68.6 ± 15.0 years in RIFLE, AKIN and KIDGO classification Le Jemtel et al. [12] showed a mean age of 57 ± 11 years which was similar to our result.

Age and Sex

The above table shows distribution of patients according to sex. It was observed that majority of patients were male (74%) and females were 26%. It was observed that majority of patients were in the age group 51-60 years (30%) followed by 41-50 years (27%).

In a study by HR Shah [7] Out of 50 patients, about two-third patients were males (66%), which is similar to our result.

Zhilian Li et al. [11] showed 58% males in all three categories of RIFLE, AKIN and KIDGO classification Antonietta Gigante et al. [6] showed males (68.9%) in their study which was similar to our result. Bart et al. [13] had in his study found that 75% of the patients were men which is similar to this study.

BMI

The above table shows that most of the patients in this study were within normal BMI (65%) vs Overweight (35%).

The mean BMI was 24.1±2.0

Le Jemtel et al. [12] showed a mean BMI of 30 ± 5.

Pastori et al. [3] had 23% obese individuals in their study group.

Heart failure

Our shows that majority of the patients were in Definite Heart Failure (51%) according to Boston Classification Score and Possibly (45%) in heart failure. Only 4% patients were Unlikely to be in Heart failure according to Boston score.

When classified according to NYHA our study shows most of the patients were in NYHA Class II (48%), followed by NYHA Class III (38%), NYHA Class IV (8%) and least in NYHA Class I (6%).

In a study by HR Shah [6] All patients presented with dyspnea (n-50), mainly of NYHA grade 3. Wu et al. [5] showed nyha class II as 11.5% nyha class iii as 34.6% and nyha class IV as 53.9%. Le Jemtel et al. [10] showed 12% patients in NYHA class II and 88% patients in NYHA class III.

Kidney injury

Our study showed that 53% patients had non-significant renal impairment after acute decompensated heart failure, whereas 47% of the patients had AKI according to RIFLE criterion which 41% patients in risk, 5% in injury and 1% in failure according to rifle criteria.

Zhilian Li et al. [11] showed the incidence of 32.1% by rifle criteria, 34.7% by AKIN criteria and 38.9% by KIDGO criteria.

Vandenberghe et al. [14] in a meta-analysis of CRS1 studies showed an incidence of 47.4% of AKI in patients with acute decompensated heart failure which is similar to our study.

Hospital stay

Our study shows average hospital stay of 5.6±1 day. Most of the cases were either discharged or referred to higher centres Zhilian Li et al. [11] showed the mean LOSICU of 7 days (range 3-11) which is similar to our study.

Eren et al. [10] showed mean hospital stay of 6.71± 3.33 days which was similar to our study. Vandenberghe et al. [14] in a meta-analysis of CRS1 studies showed that C RS-1 is associated with an increased LOS ICU and LOS hosp (1.5 and 3.5 days, respectively).

Creatinine

In a study by Le Jemtel et al. [12] showed a serum creatinine of 1.5±0.6 mg/dl Similar results were obtained in our study shows where creatine on day 1 was 1.3±0.8 , mean creatinine on day 2 was 1.5±0.7, mean creatinine was 1.6±0.7 and mean creatinine on day of discharge was 1.6±0.7.

How to cite this article: Bilal B A, Nida N, Khalid M, Chirajit S. Cardiorenal Syndrome Type I A-A Study of its Incidence, Risk Factors, Laboratory Parameters and Outcome. J Cardiol & Cardiovasc Ther. 2019; 14(3): 555887. DOI: 10.19080/JOCCT.2019.14.555887

Eren et al. [10] showed mean serum creatinine of 1.23±0.68. Palazzuoli et al. [5] in their study had higher mean creatinine of 2.1±0.9 mg/dl but it included all categories of CRS.

S. Creatinine Clr

Zhilian Li et al. [11] showed the Admission eGFR 58.8± 24.1 in CRS1 patients in their study. This is similar to the mean s. creatinine clearance in this study which was 62.1 ± 25.8. Pastori et al. [3] showed the mean s. creatinine clearance in his study was 62 (55-75) ml/ min/1.73. Palazzuoli et al. [5] had a mean s. creatinine clr of 29±11 which was dissimilar to this study.

In a study by HR Shah [6] Out of 50 patients the mean S. Creatinine was 24.4 ± 12.48 which was dissimilar to this study but had all the CRS classes.

Risk Factors

This study shows that the most common risk factor was hypertension (75%) followed by diabetes (44%), smoking (35%), dyslipidemia (30%) and Alcohol (14%).

In a study by HR Shah [8] among the study population, 39 (78%) patients were hypertensive and 32 (64%) were diabetic. Whereas 22 (44%) had dyslipidemia. This is similar to our study.

Pastori et al. [3] showed a very high percentage of Diabetes 63% Hypertension 90% and dyslipidemia 43% patients in CRS1 patients which is very high than this study.

Zhilian Li et al. [11] showed that in CRS1 patients with RIFLE criteria the percentage of patients with hypertension was 65.4% and Diabetes was 30.5% which is very similar to this study.

Palazzuoli et al. [5] in their study of CRS1 patients had Hypertension 73%, Diabetes mellitus 59% and dyslipidemia 59% which is very similar to this study. Bart et al. [13] had in his study found that 85% had hypertension, and 66% had diabetes mellitus.

Anaemia

This study shows that 61% of the patients were within normal range, 21% of the patients had mild Anemia, 13% had moderate anemia whereas only 5% had severe anemia at the time of presentation according to WHO Criteria for anemia.

Efstratiadis et al. [15] in a similar study showed that Anemia (Hb < 12g/dl) was present in 55.6% of all patients of CRS.

The mean Hb in this study was 11.6882±2.675 g/dl. Eren Z et al. [10] showed mean Hb of 11.24 ± 2.03 in patients of ADFH with CRS1 which is similar to this study.

Pastori et al. [3] in their study showed the mean haemoglobin of 11.4g/dl (Range 9.7-13.0) which is similar to this study HR Shah et al showed in their study that the mean Hemoglobin (g/dl) was 10.75±2.34 Which was lower than that of our study but their study included all CRS subtypes which had CKD patients as well

Left ventricular ejection fraction

The mean ejection fractioin in this study was 41% ± 7%. This study shows that 49% of the patients had mild lv systolic dysfunction whereas 41% patients had moderate lv systolic dysfunction. Only 10% patients had severe lv systolic dysfunction.

Bart et al. [13] had in his study found that median ejection fraction was 33%., thus cannot be compared with our mean ejection fraction.

Pastori et al. [3] in their study showed the mean ejection fraction of 35% (25-51%) which is lower than this study Palazzuoli et al. [5] in their study had Left ventricular ejection fraction (mean ± SD), % 34 ± 10 which is lower than this study. Zhilian Li et al. [11] showed the mean LVEF (%) was 48.5±12.3 which is higher than this study. Tasić et al. [16] in their study showed an LVEF of 46.27±14.31 which is similar to this study.

Total cholesterol

This study shows that 78% of the patients were in optimal range for total cholesterol, 10% of the patients had intermediate level of total cholesterol, 12% had High cholesterol levels. Pastori et al. [3] showed a very high percentage of dyslipidemia 43% patients in CRS1 patients which is very high than this study. Palazzuoli et al. [5] in their study had higher percentage of Dyslipidemia in 59% of CRS patients which is higher than this study.

Outcome

The above table and graph show that most of the patient in BOSTON Class of "UNLIKELY" had either recovery, the "POSSIBLE" group of BOSTON class mostly had either complete or partial recovery Whereas the "DEFINITE" group of BOSTON Class that mostly persistent symptoms or Death. The total mortality in this study of CRS1 was 7%.

HR Shah et al showed in their study that in his study out of the 23 subjects who presented with CRS type I there were 2 deaths in this group. Thus, the mortality in CRS1 pt in his study was 8% which is similar to our study Vandenberghe et al. [14] in a meta-analysis of CRS1 studies showed a mortality of 4.90(range between 3.68-6.52) by all definitions of AKI. This is less than the mortality in our study Cheng and Chen et al. [17]. in Chinese Cohorts study of CRS1 patients showed a mortality range from 3.4% to 16.5% in different groups of acute decompensated heart failure.

Zhilian Li et al. [11] showed the in-hospital mortality rate was 13.5% (136 patients). Hospital mortality in AKI patients was 23.5% by RIFLE, 23.8% by AKIN, and 23.5% by KDIGO criteria. This is much higher than our study.

Eren et al. [10] showed A total of 16 in-hospital deaths (5.5%) in their study which is less than this study.

The limitation of present study was that it was not a population-based study and the relatively small sample size, it limits the extent to which we may draw conclusions from our findings. Also, patients in need for revascularization and cardiac surgery were transferred to superspeciality hospitals for further management and thus limiting the follow up of the patients.

How to cite this article: Bilal B A, Nida N, Khalid M, Chirajit S. Cardiorenal Syndrome Type I A-A Study of its Incidence, Risk Factors, Laboratory Parameters and Outcome. J Cardiol & Cardiovasc Ther. 2019; 14(3): 555887. DOI: 10.19080/JOCCT.2019.14.555887

Conclusion

The present observational study was conducted to know the incidence, risk factors, laboratory parameters and outcome of CRS1 patients All patients with diagnosis of Chronic Cardiorenal syndrome were excluded from this study. This study shows that in patients of Acute Decompensated Heart failure 47% of the patients had AKI according to RIFLE criterion. This study emphasizes the importance of early diagnosis and prompt management of Cardiorenal syndrome to prevent morbidity and mortality.

In this study the Calculated mean age is 55.3±12.8 years It was observed that majority of patients were male (74%) and females were 26%. In this study Hypertension was the most common pre-existing risk factors (75%) followed by diabetes (44%), smoking (35%), dyslipidemia (30%) and Alcohol (14%). Our study shows that according to WHO Criteria for anemia. upon admission with acute decompensated heart failure 21% of the patients had mild Anemia, 13% had moderate anemia whereas only 5% had severe anemia at the time of presentation. This study also emphasizes the importance of the evaluation of both renal and cardiovascular systems to prevent further deterioration in both cardiac and renal function and the cascading effect of the complex interaction between the two organs.

The male predominance, age group 40-50 and 50-60, hypertension, diabetes, smoking and anaemia are risk factors for development of Cardiorenal syndrome type 1 and prompt diagnosis and management reduces morbidity and mortality Further studies are needed in order to verify our observations and evaluate Cardiorenal Syndrome in more detail with larger population.

References

1. Pokhrel N, Maharjan N, Dhakal B, Arora RR (2008) Cardiorenal syndrome: A literature review. Exp Clin Cardiol 13(4): 165-170.
2. Liu PP (2008) Cardiorenal syndrome in heart failure: a cardiologist's perspective. Can J Cardiol 24(Suppl B): 25B-29B.
3. Pastori S, Virzì GM, Brocca A, de Cal M, Clementi A, et al. (2015) Cardiorenal syndrome type 1: a defective regulation of monocyte apoptosis induced by proinflammatory and proapoptotic factors. Cardiorenal Med 5(2): 105-115.
4. Hardegree EL, Albright RC (2012) Amiodarone-Induced Hypothyroidism Presenting as Cardiorenal Syndrome. Case Rep Cardiol 2012: 161450.
5. Palazzuoli A, Ruocco G, Pellegrini M, Martini S, Del Castillo G (2014) Patients with Cardiorenal Syndrome Revealed Increased Neurohormonal Activity, Tubular and Myocardial Damage Compared to Heart Failure Patients with Preserved Renal Function. Cardiorenal Med 4(3-4): 257-268.
6. Gigante A, Liberatori M, Gasperini ML, Sardo L, Di Mario F, et al. (2014) Prevalence and Clinical Features of Patients with the Cardiorenal Syndrome Admitted to an Internal Medicine Ward. Cardiorenal Med 4(2): 88-94.
7. Clementi A, Virzì GM, Brocca A, Ronco C (2017) The Role of Endotoxin in the Setting of Cardiorenal Syndrome Type 5. Cardiorenal Med 7(4): 276-283.
8. HR Shah, NP Singh, NP Aggarwal, D Singhania, LK Jha, et al. (2016) Cardiorenal Syndrome: Clinical Outcome Study. Journal of The Association of Physicians of India 64: pp. 41-46.
9. Wu B, Yan W, Li X, Kong X, Yu X, et al. (2017) Initiation and Cessation Timing of Renal Replacement Therapy in Patients with Type 1 Cardiorenal Syndrome: An Observational Study. Cardiorenal Med 7(2): 118-127.
10. Eren Z, Ozveren O, Buvukoner E, Kaspar E, Degertekin M, et al. (2012) Single-Centre Study of Acute Cardiorenal Syndrome: Incidence, Risk Factors and Consequences. Cardiorenal Med 2(3): 168-176.
11. Li Z, Cai L, Liang X, Du Z, Chen Y, et al. (2014) Identification and Predicting Short-Term Prognosis of Early Cardiorenal Syndrome Type 1: KDIGO Is Superior to RIFLE or AKIN. PLoS One 9(12): e114369.
12. Le Jemtel TH, Rajapreyar I, Selby MG, Payne B, Barnidge DR, et al. (2015) Direct Evidence of Podocyte Damage in Cardiorenal Syndrome Type 2: Preliminary Evidence. Cardiorenal Med 5(2): 125-134.
13. Bart BA, Goldsmith SR, Lee KL, Givertz MM, O'Connor CM, et al. (2012) Ultrafiltration in Decompensated Heart Failure with Cardiorenal Syndrome. N Engl J Med 367(24): 2296-2304.
14. Vandenberghe W, Gevaert S, Kellum JA, Bagshaw SM, Peperstraete H, et al. (2016) Acute Kidney Injury in Cardiorenal Syndrome Type 1 Patients: A Systematic Review and Meta-Analysis. Cardiorenal Med 6(2): 116-128.
15. Efstratiadis G, Konstantinou D, Chytas I, Vergoulas G (2008) Cardio-renal anemia syndrome. Hippokratia 12(1): 11-16.
16. Tasić D, Radenkovic S, Stojanovic D, Milojkovic M, Stojanovic M, et al. (2016) Crosstalk of Various Biomarkers That Might Provide Prompt Identification of Acute or Chronic Cardiorenal Syndromes. Cardiorenal Med 6(2): 99-107.
17. Cheng H, Chen YP (2015) Clinical Prediction Scores for Type 1 Cardiorenal Syndrome Derived and Validated in Chinese Cohorts. Cardiorenal Med 5(1): 12-19.

DOI: 10.19080/JOCCT.2019.14.555887

How to cite this article: Bilal B A, Nida N, Khalid M, Chirajit S. Cardiorenal Syndrome Type I A-A Study of its Incidence, Risk Factors, Laboratory Parameters and Outcome. J Cardiol & Cardiovasc Ther. 2019; 14(3): 555887. DOI: 10.19080/JOCCT.2019.14.555887