

Original Research

Profile of patients with Cardiorenal syndrome in critical care/ICU: An observational study

Anmol Malhotra¹, Archana Bhate²

¹Resident, ²Professor, Department of General Medicine, DY Patil School of Medicine, Navi Mumbai

ABSTRACT:

Background: Cardiorenal syndrome (CRS) is defined as a complex pathophysiological disorder of the heart and the kidneys in which acute or chronic dysfunction in one organ may induce acute or chronic dysfunction in the other organ. Hence; the present study was undertaken for assessing the profile of patients with Cardiorenal syndrome in critical care/ICU. **Materials & methods:** A total of 100 patients with diagnosis of CRS admitted to critical care/intensive care unit were enrolled. Complete demographic and clinical details of all the patients were obtained. A Performa was made and clinical along with etiologic data of all the patients was recorded. Presence of any association comorbidity was also recorded separately. Radiographic analysis was done and findings were recorded separately. All the results were summarized in Microsoft excel sheet and were analysed by SPSS software. **Results:** Mean age of the subjects was 53.6 years. Total 52 percent of the patients had type 1 CRS, 10 percent had type 2, 5 percent had type 3, 4 percent had type 4 and 29 percent had type 5 CRS respectively. Diabetes and acute kidney injury as co-morbid condition was seen in 27 percent and 15 percent of the patients respectively while septicaemia and acute coronary syndrome were seen in 15 percent and 6 percent of the patients respectively. Hypertension was seen in 42 percent of the patients. **Conclusion:** Type 1 and Type 5 are the most common type of CRS encountered.

Key words: Cardiorenal syndrome, Critical care, Intensive care unit

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Corresponding author: Dr. Archana Bhate, Professor, Department of General Medicine, DY Patil School of Medicine, Navi Mumbai

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INTRODUCTION

Cardiorenal syndrome (CRS) is defined as a complex pathophysiological disorder of the heart and the kidneys in which acute or chronic dysfunction in one organ may induce acute or chronic dysfunction in the other organ. This has been recently classified into five subtypes on the basis of the primary organ dysfunction (heart or kidney) and on whether the organ dysfunction is acute or chronic. Of particular interest to the critical care specialist are CRS type 1 (acute cardiorenal syndrome) and type 3 (acute renocardiac syndrome). Initial history and physical examination tailor the provider's approach towards the appropriate investigation for determining the underlying etiology. The initial laboratory workup should include a complete blood count (CBC), complete metabolic panel (CMP), urine studies (urinalysis with microscopy, urine protein to

creatinine ratio, urine sodium), brain natriuretic peptide (BNP), and troponin.¹⁻³ The estimated glomerular filtration rate (eGFR) is calculable from the creatinine level to help determine the degree of renal impairment. The pathophysiology of acute cardiorenal syndrome involves renal venous congestion, ineffective forward flow, and impaired renal autoregulation caused by neurohormonal activation. Biomarkers reflecting different aspects of acute cardiorenal syndrome pathophysiology may allow patient phenotyping to inform prognosis and treatment. Adjunctive vasoactive, neurohormonal, and diuretic therapies may relieve congestive symptoms and/or improve renal function, but no single therapy has been proved to reduce mortality in acute cardiorenal syndrome.⁴⁻⁶ Hence; the present study was undertaken for assessing the profile of patients with Cardiorenal syndrome in critical care/ICU.

MATERIALS & METHODS

The present study was undertaken for assessing the profile of patients with Cardiorenal syndrome in critical care/ICU. A total of 100 patients with diagnosis of CRS admitted to critical care/intensive care unit were enrolled. Complete demographic and clinical details of all the patients were obtained. A Performa was made and clinical along with etiologic data of all the patients was recorded. Presence of any association comorbidity was also recorded separately. Radiographic analysis was done and findings were recorded separately. All the results were summarized in Microsoft excel sheet and were analysed by SPSS software. Univariate regression was used for evaluation of level of significance. p- value of less than 0.05 was taken as significant.

RESULTS

In the present study, a total of 100 subjects were analysed. Mean age of the subjects was 53.6 years. Among these 100 subjects, 65 were males and 35 were females. Total 52 percent of the patients had type 1 CRS, 10 percent had type 2, 5 percent had type 3, 4 percent had type 4 and 29 percent had type 5 CRS respectively. Diabetes and acute kidney injury as co-morbid condition was seen in 27 percent and 15 percent of the patients respectively while septicaemia and acute coronary syndrome were seen in 15 percent and 6 percent of the patients respectively. Hypertension was seen in 42 percent of the patients.

Table 1: Demographic data

| Variable | Number of patients | Percentage |
|------------------|--------------------|------------|
| Males | 65 | 65 |
| Females | 35 | 35 |
| Mean age (years) | 53.6 | |

Table 2: Type of CRS

| Type of CRS | Number of patients | Percentage |
|-------------|--------------------|------------|
| Type 1 | 52 | 52 |
| Type 2 | 10 | 10 |
| Type 3 | 5 | 5 |
| Type 4 | 4 | 4 |
| Type 5 | 29 | 29 |

Table 3: Co-morbid condition

| Co-morbid condition | Number of patients | Percentage |
|-------------------------|--------------------|------------|
| Diabetes | 27 | 27 |
| Hypertension | 42 | 42 |
| Acute kidney injury | 15 | 15 |
| Acute coronary syndrome | 6 | 6 |
| Septicaemia | 15 | 15 |

DISCUSSION

The cardiorenal syndrome (CRS) refers to a complex pathophysiologic state in which heart and kidney dysfunction coexists. Although a robust amount of adult literature exists, limited reports have been made

regarding CRS in pediatric patients. However, CRS is increasingly being recognized as an impactful clinical problem that can have important implications regarding the need for treatment and prognosis. CRS type 1 is characterized by an acute deterioration in cardiac function that leads to acute kidney injury (AKI); in CRS type 3, AKI leads to acute cardiac injury and/or dysfunction, such as cardiac ischemic syndromes, congestive heart failure, or arrhythmia. Both subtypes are encountered in high-acuity medical units; in particular, CRS type 1 is commonly seen in the coronary care unit and cardiothoracic intensive care unit.⁷⁻¹⁰ Hence; the present study was undertaken for assessing the profile of patients with Cardiorenal syndrome in critical care/ICU.

In the present study, a total of 100 subjects were analysed. Mean age of the subjects was 53.6 years. Among these 100 subjects, 65 were males and 35 were females. Total 52 percent of the patients had type 1 CRS, 10 percent had type 2, 5 percent had type 3, 4 percent had type 4 and 29 percent had type 5 CRS respectively. Patil VC et al analysed patients with diagnosis of CRS admitting in medical intensive care unit and medical wards. Total 110 (50.6 ±9.34 years) patients fulfilling criteria of cardio-renal syndrome were included in this study. Total 51.81% patients had type 1 CRS, 2.72% type 2, 10% type 3, 2.72% type 4 and 27.27% had type 5 CRS. Type 1 CRS was most common and next was type 5 CRS ('p' <0.002). Total 15.45% patients presented with pulmonary edema, 22.72% with hypertension, 27.27% had type-2 diabetes mellitus, 8.18% with AKI, 10.90% with septicemia, 13.63% with acute coronary syndrome (ACS). Total 50% patients had diastolic dysfunction. Significant proportion (more than one third) of population had hypertension, diabetes mellitus and or IHD as pre-existing co-morbidity in patient with diagnosis of CRS ('p' <0.03). Total 79.09% patients with CRS received pharmacotherapy and 20.90% received ultrafiltration as a treatment modality. Overall case fatality rate for CRS was 8.18%. The present study highlighted majority of patient had type 1 and 5 cardiorenal syndrome.¹⁰

In the present study, diabetes and acute kidney injury as co-morbid condition was seen in 27 percent and 15 percent of the patients respectively while septicaemia and acute coronary syndrome were seen in 15 percent and 6 percent of the patients respectively. Hypertension was seen in 42 percent of the patients. Gigante A et al evaluated the prevalence of the cardiorenal syndrome (CRS) and clinical features. Out of 1,087 patients discharged from our unit during the study period, 190 (17.5%) were diagnosed as having CRS and classified into five types. CRS was more common in males (68.9%). CRS type 1 was associated with higher age (79.9 ± 8.9 years) and accounted for 61.5% of all deaths (p < 0.001), representing a risk factor for mortality (OR 4.23, 95% CI 1.8–10). Congestive heart failure was significantly different among the five CRS types (p < 0.0001) with

a greater frequency in type 1 patients. Infectious diseases were more frequent in CRS types 1, 3 and 5 ($p < 0.05$). Pneumonia presented a statistically higher frequency in CRS types 1 and 5 compared to other classes ($p < 0.01$), and community-acquired infections were statistically more frequent in CRS types 1 and 5 ($p < 0.05$). The distribution of community-acquired pneumonia was different among the classes ($p < 0.01$) with a higher frequency in CRS types 1, 3 and 5. CRS is a condition that is more frequently observed in the clinical practice.¹¹

CONCLUSION

Type 1 and Type 5 are the most common type of CRS encountered.

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