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ORIGINAL ARTICLE

Prevalance of Renal and Electrolyte Disorders in Chronic Heart Failure Patients

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ABSTRACT

Objective: To determine the prevalence of renal and electrolyte disorders in patients presented with chronic heart failure.
Study Design: Cross sectional/Observational
Place & Duration of Study: Data was collected from the different tertiary care hospitals of Pakistan, including Rawal Institute of Health Sciences, Islamabad and Department of Cardiology, Rashid Latif Medical College, Lahore During the period from January, 2022 to June, 2022.
Methods: Total 210 patients of both genders with ages 25 to 75 years presented with chronic heart failure were analyzed. Patients detailed demographic were recorded after taking written consent. Blood samples of all the patients were collected to examine the serum electrolyte and serum creatinine. Prevalence of renal dysfunction and electrolyte disorders were recorded.ae
Results: One hundred and fifty two (72.38%) patients were males while 58 (27.62%) patients were females. 85 (40.48%) patients were ages 25 to 50 years and 125 (59.52%) were ages between 51 to 75 years. Renal dysfunction was found in 61 (29.05%) patients, 56 (26.67%) patients had hypokalemia and hyponatremia was found in 59 (28.10%) patients.
Conclusion: The incidence of renal dysfunction and electrolyte disorders in patients with chronic heart failure was high. Patients with ages above 50 years had high rate of renal dysfunction, hypokalemia and hyponatremia.
Keywords: Chronic Heart Failure, Renal Dysfunction, Hyponatremia, Hypokalemia

INTRODUCTION

As a multifaceted condition, heart failure (HF) can have a variety of root causes, including anatomical and functional cardiac issues. The pumping chambers of the heart have trouble keeping blood moving normally when affected by several conditions [1]. Approximately 2% of the population in developed countries suffers from congestive heart failure. The major cause of hospitalisation in patients aged 65 and beyond, its prevalence skyrockets from 1% in those aged 40–75 to 10% in those aged 75 and over [2].

Patients with chronic heart failure (CHF) are at increased risk for electrolyte imbalances and renal dysfunction, which may be brought on by the disease or its treatment [3, 4]. In any patient with volume excess or a known medical history of fluid retention, diuretics are the recommended treatment [4]. Prerenal azotemia and electrolyte abnormalities can occur if a patient urinates more than necessary [5, 6], thus it's important to only take the minimum amount of medication necessary to treat the condition.

Low potassium levels increase the risk of potentially deadly arrhythmias in the ventricular myocardium. [7] Patients with congestive heart failure have been found to have a higher risk of hypokalemia. Having renal impairment and hyponatremia is associated with a poor outcome in people with CHF [8-9]. Hyponatremia is associated with significantly increased in-hospital mortality and post-discharge mortality in patients with CHF [10]. Extensive research has shown that hyponatremia affects 24 percent of people with CHF. [Footnote required] Mortality rates after hospital discharge are predicted to be higher in heart failure patients with even mild to moderate elevations in baseline blood urea nitrogen levels. Twenty-nine percent of patients with CHF have moderate to severe renal impairment, according to a meta-analysis [11].

The purpose of this study was to examine the incidence of renal dysfunction and electrolyte disorders such hyponatremia and hypokalemia in patients who self-reported with chronic heart failure.

MATERIALS AND METHODS

This cross sectional/observational study was conducted at Department of Adult cardiology, Peshawar institute of Cardiology, Peshawar KPK During the period from January, 2022 to June, 2022. Two hundred and ten patients of both genders with ages 25 to 75 years presented with chronic heart failure were analyzed. Patient's demographics including age, sex and residence were recorded after taking written informed consent. Patients with chronic liver disease, patients with chronic kidney disease and diabetic nephropathy patients were excluded. Blood samples of all the patients were collected to examine the serum creatinine and serum electrolyte. Serum creatinine >1.5mg/dl define as renal dysfunction, patients with serum potassium level <3.5mg/dl defined to had hypokalemia and serum sodium level <135mg/dl defined hyponatremia. Prevalence of renal dysfunction and electrolyte disorders were recorded. All the data was analyzed by SPSS 24.0. Frequency and percentages were recorded in tabulation form. P-value <0.05 was set as statistically significant.

RESULTS

Out of 210 patients, 152 (72.38%) patients were males while 58 (27.62%) patients were females. 85 (40.48%) patients were ages 25 to 50 years and 125 (59.52%) were ages between 51 to 75 years. 130 (61.90%) patients had urban residency while 80 (39.10%) patients had rural residence (Table 1). Renal dysfunction was found in 61 (29.05%) patients, 56 (26.67%) patients had hypokalemia and hyponatremia was found in 59 (28.10%) patients (Table 2).

Table 1: Demographic information of the patients

Variable	No.	%
Gender		
Male	152	72.38
Female	58	27.62
Age (years)		
25 – 50	85	40.48
50 – 75	125	59.52
Residence		
Urban	130	61.9
Rural	80	39.1

According to the age-wise distribution, out of 61 renal dysfunction patients 40 (65.58%) patients were ages above 50

years and 21 (34.42%) patients were ages below 50 years. From 59 hypontremia patients 32 (54.24%) were ages above 50 years and 27 (45.76%) patients had ages below 50 years and out of 56 hypokalemia patients 34 (60.71%) patients were ages above 50 years while 22 (39.29%) patients had ages below 50 years (Table 3)

Table 2: Frequency of renal dysfunction, hypokalemia and hyponatremia in CHF patients

Variables	No.	%
Renal Dysfunction		
Yes	61	29.05
No	149	71.95
Hyponatremia		
Yes	59	28.1
No	151	71.9
Hypokalemia		
Yes	56	26.67
No	154	73.33

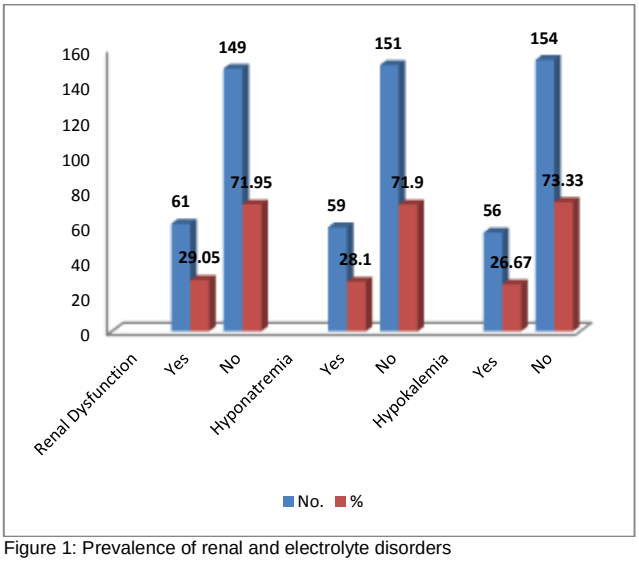

Figure 1: Prevalence of renal and electrolyte disorders

Table 3: Stratification of age according to renal dysfunction and electrolyte disorders

Variable	Age 25 to 50 yrs	51 to 75 years	P-Value
Renal Dysfunction (n=61)	21 (34.42%)	40 (65.58%)	0.025
Hyponatremia (n=59)	57 (45.76%)	32 (54.24%)	0.328
Hypokalemia (n=56)	22 (39.29%)	34 (60.71%)	0.029

DISCUSSION

Chronic heart failure is one of the most common disorders in all over the world with high rate of mortality and morbidity [12]. Renal dysfunction and electrolyte disorders are most common disorders in patients with chronic heart failure. Many of studies have been conducted to examine the prevalence of renal dysfunction, hypokalemia and hyponatremia in patients with chronic heart failure and reported these disorders contributed high rate of morbidity and mortality and increase length of hospital stay in CHF patients [13-14]. Present study was conducted to examine the incidence of renal dysfunction and electrolyte disorders including (hypokalemia and hyponatremia) in patients presented with chronic heart failure. In this regard we included 210 patients. We found male patients was high in numbers 72.38% as compared to females 27.62%. Many of previous studies reported that male patients with chronic heart failure were high in numbers 60 to 80% as compared to females [15-16]. In our study majority of patients 59.52% were ages above 50 years. These results showed similarity to many other studies in which patients with elderly ages had high incidence rate of chronic heart failure [17].

In present study, renal dysfunction was found in 61 (29.05%) patients, 56 (26.67%) patients had hypokalemia and hyponatremia was found in 59 (28.10%) patients. A study conducted by Haq R et al [18] reported renal dysfunction in 26.9%, hypokalemia in 24.6% and hyponatremia in 28.4% patients presented with chronic heart failure. Another study conducted by Ahmad F et al [19] reported the incidence of renal dysfunction in chronic heart failure was 37.4%. hyponatremia in 32.1% patients and hypokalemia in 18.1% patients.

In present study, according to the age-wise distribution, out of 61 renal dysfunction patients 40 (65.58%) patients were ages above 50 years and 21 (34.42%) patients were ages below 50 years. From 59 hypontremia patients 32 (54.24%) were ages above 50 years and 27 (45.76%) patients had ages below 50 years and out of 56 hypokalemia patients 34 (60.71%) patients were ages above 50 years while 22 (39.29%) patients had ages below 50 years. These results showed similarity to many previous studies in which patients with elderly ages had high risk of renal dysfunction, hypokalemia and hyponatremia. [20-22]

CONCLUSION

Renal dysfunction and electrolyte disorders are most common in patients with chronic heart failure and causes high rate of mortality and morbidity in CHF patients. We concluded from this study that that the incidence of renal dysfunction and electrolyte disorders in patients with chronic heart failure was high. Patients with ages above 50 years had high rate of renal dysfunction, hypokalemia and hyponatremia.

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