

Hyponatremia in patients with heart failure

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ABSTRACT

OBJECTIVE:

To see the frequency of hyponatremia in patients with heart failure in cardiology Department at Liaquat university hospital Hyderabad sindh Pakistan.

Methodology: In this Descriptive Cross-sectional Study we included total number of hundred fifty patients of heart failure in department of cardiology Liaquat University Hospital Hyderabad from april to July 2013, Serum sodium level of these patients were sent and results were recorded on a preformed profarma, we included all patients who had heart failure.

Results: In this study we included 150 patients of heart failure, we found 21.3% of patients have hyponatremia with 11.3% mild, 6% moderate, and 4% of patients have severe hyponatremia. . P-value was (0.032) and (0.01) significant in age groups, severity and no: of cases increased with increasing age, hyponatremia was severe in older patients, P-value was (0.81) insignificant on gender basis means there is no difference of hyponatremia in male and female patients.

Conclusion: Hyponatremia is common in patients with heart failure, prevalence and severity increases with age, and there is no gender difference.

Key Words: Hyponatremia, Heart Failure, Cardiology Department, Liaquat University Hospital.

INTRODUCTION:

Hyponatremia is defined as a serum sodium concentration <135 mEq/L, is a relatively common finding in patients hospitalized with heart failure (HF), with an incidence of 20% to 25%,¹⁻⁶ no local data is available in Pakistan. hyponatremia can be classified as mild (128 to 134meq/L), moderate(120 to 127meq/L), and severe (less than 120meq/L).⁷⁻⁸ hyponatremia results from relative excess of body water in comparison to sodium, In patients with heart failure Anti diuretic hormone will and impair the ability to excrete water. Anti diuretic hormone directly enhances water reabsorption in collecting tubules causing dilutional and hypervolemic hyponatremia,⁹The profound reduction in cardiac output in severe HF is an important mechanistic prompt for the development of hyponatremia. As cardiac output drops, renal blood flow and glomerular filtration follow it. This reduces the rate of solute and H₂O delivery to the distal diluting segment of the nephron, impairing the ability of the kidney to excrete a dilute urine. At the same time, enhanced fractional reabsorption in the proximal tubule diverts even more Na⁺andH₂O from the diluting sites, further impairing the production of a dilute

urine.¹⁰ The decrease in cardiac output activates through baroreceptors the sympathetic nervous system and the renin-angiotensin-aldosterone system and thus the release of arginine vasopressin, which enhances renal water retention,¹⁰Diuretic-induced hyponatremia is common among patients with HF, with the elderly at particular risk.¹¹⁻¹² hyponatremia mostly causes the neurological manifestations with any cause e.g. headache, nausea, vomiting, seizures and coma.⁷ , hyponatremia in patients hospitalized with HF is relatively common and is associated with a very high in-hospital mortality.¹³ the objective of study is to see the frequency of hyponatremia because it is the poor prognostic factor in heart failure, so to correct the sodium level in heart failure can improve the outcome.

Methodology:

This descriptive cross-sectional study was conducted from May to July 2013 in Department of cardiology at civil hospital Hyderabad. The aim of this study was to determine the frequency of hyponatremia in patients of heart failure (Systolic or Diastolic dysfunction). After informed consent,

patients of different ages of both sexes were included in the study. A profarma was designed which includes specific clinical features Examinations and investigations to diagnose the patients of heart failure. One hundred and fifty patients of heart failure were taken and serum sodium level was sent to Laboratory to get the value. The diagnosis of heart failure was based on Specific clinical features and examinations, ECG and Echocardiographic findings. The values of serum sodium level took in the study were Normal 135 to 148meq/L, Mild Hyponatremia 128 to 134meq/L, Moderate Hyponatremia 120 to 127meq/L, Severe Hyponatremia less than 120meq/L. The data was entered and analyzed in statistical program SPSS version 16.0. Frequencies and percentages were computed for qualitative variables like gender, severity of hyponatremia, age (in groups) etc and chi square test was applied to compare the proportions. The numerical variables such as age (in years), was presented as Mean \pm Standard deviation and "t" test including student or ANOVA. All the data calculated on 95% confidence interval. A p- value ≤ 0.5 will be considered as statistically significant Level.

RESULTS:

In this study, we included 150 patients of heart failure, out of which we found 21.3% of patients have Hyponatremia with 11.3% mild, 6% moderate, and 4% of patients have severe hyponatremia. 19 (59.4%) patients were males and 13 (40.6%) patients were females, 17 patients have mild Hyponatremia with the mean age 44.76 ± 10.69 (Mean \pm SD), 9 patients have moderate hyponatremia with the mean age 52.66 ± 19.49 (Mean \pm SD) and 6 patients have severe hyponatremia with the mean age 65.83 ± 13.19 . P-value was (0.032) and (0.01) significant in age groups, severity and no: of cases increased with increasing age, we found hyponatremia was severe in older patients, P-value

was(0.81)Insignificant on gender basis means there is no difference of hyponatremia in male and Female patients.

DISCUSSION:

Currently, no data is available on frequency of hyponatremia in heart failure in Pakistan. Therefore, we conducted this study in our setup. Our study indicates that hyponatremia is common in hospitalized patients of heart failure in tertiary care hospital of Hyderabad. Out of 150 Patients we found 32(21.3) patients had hyponatremia 17(11.3 %) had mild, 9(6.0%) had moderate, and 6(4.0%) had severe hyponatremia. We saw the prevalence and severity on the basis of age groups and we found that the severity and prevalence were more common in older age group. 18-30 Years age group had 4(12.5%) cases out of them 2(11.8%) were mild and 2(22.2%) were Moderate. 31-40 years age group had 4(12.5%) cases and all 4(23.5%) were mild. We did not find any case of severe hyponatremia in above two age groups. 41-50 years age group had 10(31.3%) cases, out of them 8(47.1%) were mild, 1(11.1%) was moderate and 1(16.1%) was severe hypanatremic. Patients with >50 years of age had 14(43.8%) case, 3(17.6%) mild, 6(66.7%) moderate and 5(83.3%) were severe hyponatremic. There were total of 17 mild cases with the mean age 44.76 ± 10.69 (Mean \pm SD), 9 moderate cases with mean age 52.66 ± 19.49 (Mean \pm SD), and 6 severe cases with the mean age of 65.83 ± 13.19 (Mean \pm SD). The difference of prevalence and severity were not significant on the basis of gender. Total number of male cases was 19(59.4%) and female were 13(40.6%), with the P value of 0.81 that is insignificant.

Our study agrees with previous studies conducted on the same topic with slight Variations in the result. An analysis of optimize HF registry that included 48612 patients from 259 Hospitals showed that 19.7% of patients had sodium

level below 135mmol/L.² The population was Elderly, with a mean age of 73 years². Louise balling et al carried out study that included 3465 from 18 different Danish heart failure clinics and found that 602 patients (17%) had hyponatremia¹⁴. Escape trial conducted on 433 hospitalized patients with heart failure showed that 23.8 had hyponatremia³. Naoki sato et al conducted study in Japan that showed that 11.6% of Patients had hyponatremia¹⁵.

It has been demonstrated that hyponatremia hospitalized patients with HF are in more critical condition, requiring more intensive care, and have a poorer prognosis in terms of cardiac death as well as all-cause death¹⁵. It is known that hyponatremia on admission is independently associated with increased in-hospital mortality in acute emergency medical patients. Naoki sato et al reported that 76.2% of hyponatremia hospitalized patients with HF died from cardiac causes¹⁵. Chawla et al¹⁶ demonstrated that the nature of the underlying illness, rather than the severity of hyponatremia, best explains mortality associated with

hyponatremia, using data from 45,693 admitted patients. Taken together, the increased mortality is due mainly to hyponatremia in hospitalized patients with HF.

Therefore it is very much important to emphasize to treat hyponatremia in heart failure in our setup which is unfortunately avoided conducted on small no of patients and we did not go for prognosis as well as Treatment of hyponatremia in patients with heart failure. Less or no data available regarding Prevalence in our setup. In conclusion, the present study showed that hyponatremia is common in patients with heart failure at department of cardiology civil hospital Hyderabad.

CONCLUSION:

Hyponatremia is common in patients with heart failure with statistically significant difference was observed in age groups means prevalence and severity increases with age, and statistically Insignificant result obtained on gender basis.

	Sodconc of Study Subject			Total
	134-128(mild)	127-121(moderate)	<121(severe)	

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Graph-1

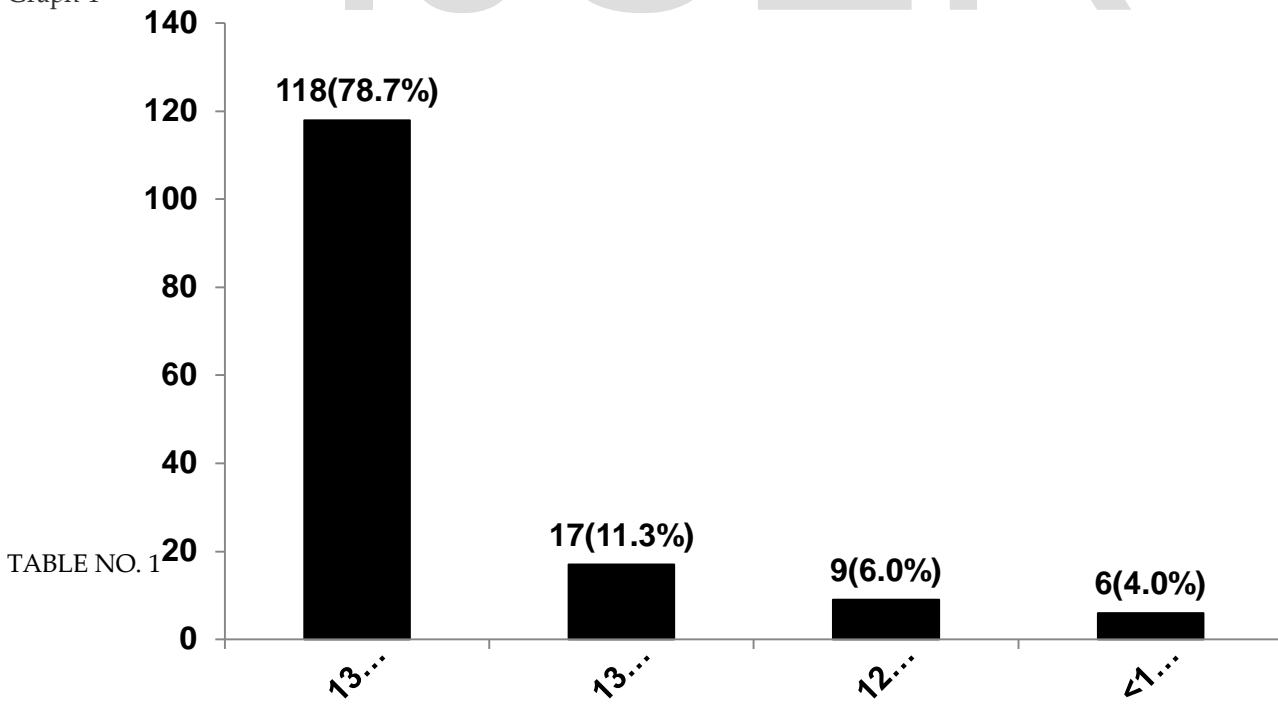


TABLE NO. 1

	n = 17	n = 09	n = 06	
Age in Groups				
18-30	2(11.8%)	2(22.2%)	0(0.0%)	4(12.5%)
31-40	4(23.5%)	0(0.0%)	0(0.0%)	4(12.5%)
41-50	8(47.1%)	1(11.1%)	1(16.7%)	10(31.3%)
>50	3(17.6%)	6(66.7%)	5(83.3%)	14(43.8%)

P value = 0.032(significant) calculated by chi square test

TABLE NO. 2

	Sodconc of Study Subject			Total	P value
	134-128(mild) n = 17	127-121(moderate) n = 09	<121(severe) n = 06		
sex of study subject					
Male	10(58.8%)	6(66.7%)	3(50.0%)	19(59.4%)	.811
Female	7(41.2%)	3(33.3%)	3(50.0%)	13(40.6%)	

P value = 0.81(insignificant) calculated by chi square test

	Mean \pm Std. Deviation
Age in years	
134-128(mild), n = 17	44.76 \pm 10.69
127-121(moderate), n = 9	52.66 \pm 19.49
<121(severe), n = 6	65.83 \pm 13.19

P value = 0.01 (significant) calculated by one way ANOVA test

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