

Etiology, Clinical Features and Outcomes of Treatment of Hyponatremia - A Prospective Study

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ABSTRACT

Hyponatremia is a common problem encountered in patients presenting with non-specific symptoms. Symptomatology depends more on the rate of development of the electrolyte abnormality than on its severity. Data regarding the incidence of hyponatremia in hospitalized patients in our country is limited.

This prospective, descriptive study was conducted at Ramakrishna care hospital Raipur from September 2016- November 2017. 100 cases were taken by random sampling method to know the common clinical features etiology and treatment outcome of hospitalized patients and study the morbidity and mortality in such patients. hyponatremia presented with various clinical symptoms out of which nausea was most common followed by vomiting, altered sensorium and seizure.

Physician need to be aware about the common occurrence of hyponatremia and early identification to prevent serious complication like seizures. Over all most common cause of hyponatremia in all 3 group was diuretics and salt restriction (53%). most of hyponatremic patients were hypertensive and number of cases increased from mild to severe hyponatremia secondary to diuretic and salt restriction it was statistically highly significant i.e. 54% ($p < 0.0001$).

Keywords: Hyponatremia-serum sodium < 135 meq/L

INTRODUCTION

Hyponatremia is defined as plasma sodium concentration < 135 meq/l. It is a very common disorder occurring in about 22

% of hospitalized patients [1]. It can be classified on the basis of serum osmolality into hypertonic, isotonic and hypotonic type.

Hypotonic hyponatremia is further classified into hypervolemic, euvolemic and hypovolemic. Both hyponatremia and hypernatremia can cause substantial morbidity, mortality and ironically incorrect diagnosis and treatment can add to the problem. Disorder of sodium and water metabolism is common in hospitalized patients and is occasionally encountered in outpatients. Both hyponatremia and hypernatremia can cause morbidity and mortality and initially incorrect treatment can end into the problem.

MATERIALS & METHODS

Study site:- Study was conducted at Ramakrishna Care Hospital, Raipur.

Study population:- All patients of 25-75 year age group getting admitted in RKCH Hospital, Raipur in Medicine department detected with low serum sodium.

Study design:- A prospective, descriptive study.

Sample size: 100, patients of 25-75 year age group getting admitted in RKCH Hospital, Raipur in Medicine department detected with serum sodium < 135 meq/l

Sampling Method: Purposive random sampling

Duration of study: September 2016- November 2017

Inclusion Criteria: Patients with serum sodium < 135 meq/l to 100 meq/l in 25-75 years age group admitted in RKCH Raipur.

Exclusion Criteria: Patients with severe renal dysfunction. (Creatinine clearance <30 ml/min/1.73m²)

Patients in deep coma. (GCS Scale: less than 3/15)

Data were collected using a pretested proforma meeting the objectives of the study.

Detailed history and necessary investigations were undertaken (CBC, RFT, LFT, Urine routine, Serum and urine osmolality, blood sugar). Some patients when required special investigation like Hormonal assay (Thyroid profile, Cortisol), 2DECHO and Neuroimaging were done. The purpose of the study was explained to the patient and informed consent obtained.

Statistical Analysis

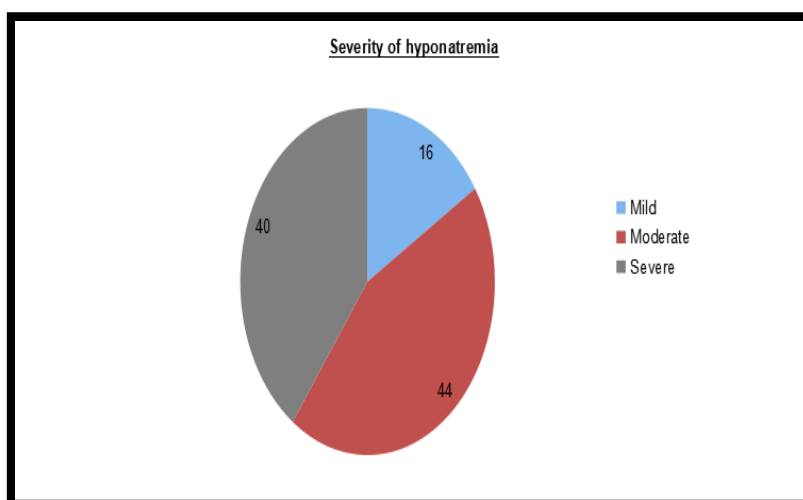
Statistical Analysis were done with software SPSS 17.0. Categorical data was express as ratio and proportions, while continuous data was express as

Mean+Standard Deviation. Quantitative data were analysed by percentage, mean, SD, T test. Qualitative data were analysed by Chi square test, Fisher exact test, concordance coefficient.

RESULT

In present study of 100 hyponatremia patients 53 % were male and 47 % were female.

In this study most of patient were aged between 61-70 years (34%). Mean age of population under the study was 57.2 ± 12.64 years. 29% patients were aged < 50 yrs while 71% patients were aged > 50 yrs. hyponatremia patient with same age group incidence of hyponatremia between male and female was not significant (p- 0.39). patients, depending on serum sodium level patients were divided in to mild (130-134mmol/L), moderate (120-129mmol/L) and severe (<120mmol/L) hyponatremia. Mild hyponatremia was found in 16% patients, while moderate and severe hyponatremia was found in 44% & 40% respectively.

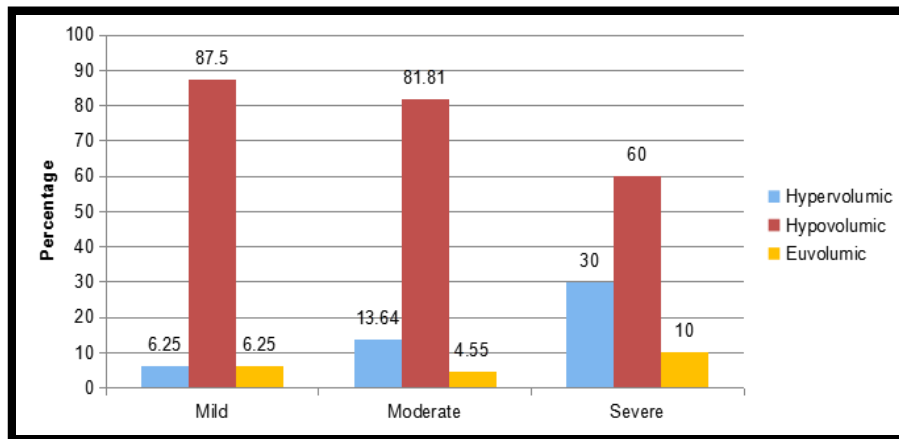


Graph -1 Severity of hyponatremia

Commonest presentation was nausea (53%) & vomiting (40%) followed by altered sensorium (21 %) & seizure (13%). In mild hyponatremia most of patients were alert (81%).

Unconscious patients were found mostly in severe hyponatremia (20%).

There is statistically significant difference in severity of hyponatremia and level of consciousness (p<0.001). There is statistically significant difference in severity of hyponatremia and GCS (p<0.009).



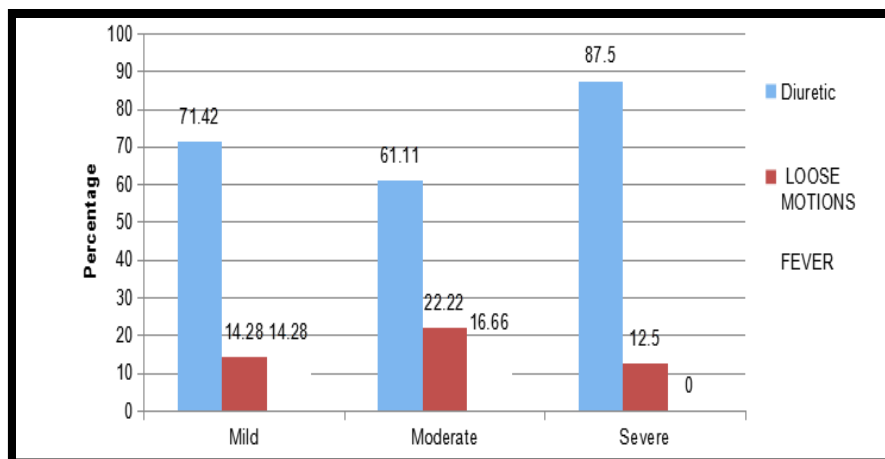
Graph -2 Volume status and severity of hyponatremia

No significant correlation was seen between volume status and severity of hyponatremia (Hypervolemic P value -0.06, Hypovolemic P value-.0.10, Euvolemic P value 0.61). Urinary spot sodium level increases with severity of hyponatremia and difference was statistically significant. (P

value= Mild vs moderate=0.03, mild vs severe <0.001 & moderate vs severe <0.0001). In hypervolemic hyponatremia Serum osmolality decreases with increase in severity of hyponatremia (mean-255.11±12.14).

Table 1- Etiology Profile of hyponatremia patients.

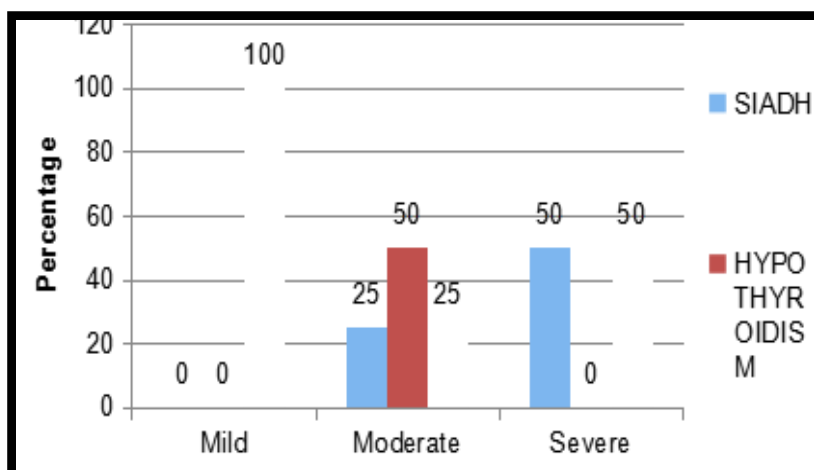
Hyponatremia	Diuretic+ Salt restriction	Loose motion	Hypothyroidism	SIA DH	Hypopituitarism	CHF	CLD	Vomiting	NEPHROTIC SYNDROMRE	T B
Mild (N=16)	10(62.5%)	2 (12.5%)	0	0	1(6.25%)	1(6.25%)	0	2(12.5%)	0	0
Moderate (N=44)	22(50 %)	8 (18.18%)	1(2.27%)	0(0%)	1(2.27%)	2(4.5 %)	3(6.8 2%)	6 (13.64%)	1(2.27%)	0
Severe (N=40)	21(52.5%)	3(7.5%)	1(2.5%)	2(5 %)	1(2.5%)	4(10 %)	4(10 %)	0	4(10%)	0
Total 100	53%	13%	2%	2%	3%	7%	7%	8%	5%	0



Graph -3: Etiology Profile of hypovolemic hyponatremia patients (n=74)

In hypovolemic hyponatremia patients most common etiology reported was Diuretic +Salt restriction in all three group of hyponatremia mild, moderate and severe 62.5%, 50% and 52.5 % respectively. Second most common etiology reported in

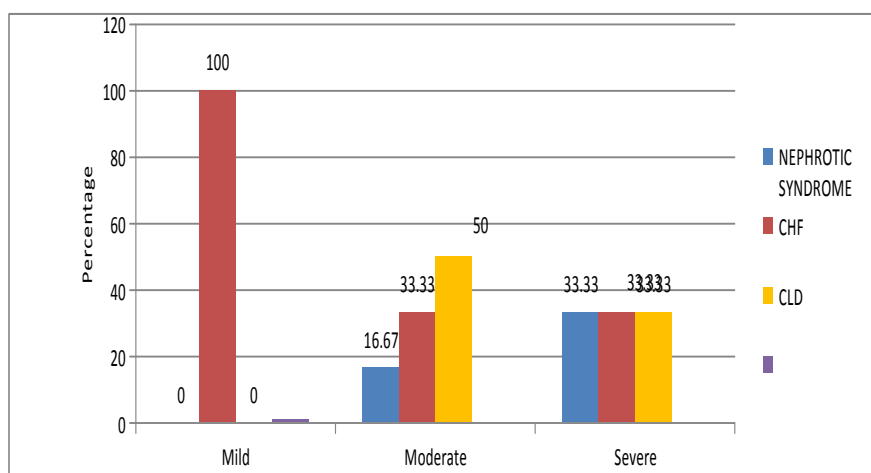
mild and moderate hyponatremia was of gastrointestinal loss (12.5% and 18.18%). Other less common causes were fever (8%), CHF (7%), CLD (7%), Pituitary Insufficiency (3%) hypothyroidism (2%) and SIADH (2%).



Graph-4 ; Etiology profile of euvoletic hyponatremia (n=7)

In Euvoletic hyponatremia, hypopituitarism found equal proportion in all group. Hypothyroidism were mostly presented with moderate hyponatremia

(50%). SIADH (50%) and Hypopituitarism (25%) cases was found in severe hyponatremia equally.



Graph:-5: Etiology Profile in hypervolemic hyponatremia (n=19)

In hypervolemic hyponatremia, 1 CHF patient (100%) presented with mild hyponatremia, while in CLD patients most of patient having moderate hyponatremia

(50%). 1 case in each group Nephrotic syndrome (33.33%), CHF (33.33%) and CLD (33.33) had severe hyponatremia.

Table :2: Treatment given in different group of patients

Hyponatremia	0.9% NaCl	3% NaCl	Furosemide	Tolvaptan	Levothyroxine	Hydrocortisone	Fluid restriction
Mild (N=16)	15(93.75%)	0%	0%	0%	0%	1(6.25%)	2(12.5%)
Moderate(N=44)	31(70.45%)	10(22.73%)	1(2.27%)	2(4.5%)	2(4.55%)	2(4.55%)	10(22.72%)
Severe(N=40)	2(5%)	35(87.5%)	5(12.5%)	4(10%)	3(7.5%)	6(15%)	7(17.5%)

In most of the patients diagnosed as mild to moderate hyponatremia were treated with 0.9 % NaCl while severe hyponatremia patients were treated with 3% NaCl. Tolvaptan seen effective in hypervolemic patients (delusional hyponatremia).

DISCUSSION

Most of patient from mild and moderate group achieved mean serum sodium 135 mmol/L by day 4 while those with severe hyponatremia requires more than 4 days. level of serum sodium (mean) in all group (mild, moderate and severe)

increases with treatment from admission till discharge. Statistically highly significant difference was seen in duration required for correction of serum sodium level mild, moderate & severe hyponatremia patients ($p < 0.001$).

Morbidity in mild hyponatremia patients in the form of duration for clinical stability was less i.e. 1.57 ± 1.87 mean while in moderate hyponatremia it was more than mild hyponatremia 2.53 ± 1.5 days and in severe hyponatremia it was 4.66 ± 1.83 days (total average duration for clinical stability was 3.24 ± 2.07). Statistically this difference was significant in mild, moderate and severe hyponatremia ($p < 0.001$)

Morbidity in mild hyponatremia patients in the form of duration for hospital stay in days was 5.13 ± 4.78 and 6.57 ± 4.36 days for moderate hyponatremia respectively which was statistically insignificant (p value-0.17), while difference between mild hyponatremia (5.13 ± 4.78 days) and severe hyponatremia (7.78 ± 2.48 days) was statistically significant $p < 0.018$.

Mortality was seen in severe hyponatremia patients [2 cases (5%)] secondary due to aspiration pneumonia after having seizure which is not significant.

No death was seen in mid and moderate group of hyponatremia patient.

Total mortality in this study was 2% (2 patients were died in 100 patients population).

CONCLUSION

100 cases of hyponatremia presented with various clinical symptoms out of which nausea was most common followed by vomiting, altered sensorium and seizure.

Elderly hypertensive patients on diuretic, more prone to develop hyponatremia.

Physician need to be aware about the common occurrence of hyponatremia and early identification to prevent serious complication like seizures.

The patient admitted with hyponatremia should be asked for drug history like diuretics, for extra renal loss in

the form of loose motion, vomiting and also screen for hypothyroidism and in some special cases also for hypopituitarism. Thus early diagnosis and treatment with closed monitoring of serum sodium during treatment will prevent morbidity and mortality, it may helps in full recovery.

Correction of sodium should be done under close monitoring to prevent central pontine myelinolysis (CPM) in all groups of patients but more precautions should be taken in severe hyponatremia. However, a briefer study is recommend with larger sample size and proper assessment to further strengthen the understanding of the problem. This may help in modifying current guidelines of management of hyponatremia translating into better patient care and preventing complications of treatment.

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