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CLINICAL PROFILE AND OUTCOME IN PATIENTS WITH PROFOUND HYPONATREMIA

Endocrinology

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ABSTRACT

Background & objectives : The aim of the study is to know the clinical profile and outcome in hospitalized patients with profound hyponatremia.
Methods: In this prospective study 300 Patients of age >18 years admitted in medical emergency , wards , ICU's of DMC & H with profound hyponatremia were enrolled for study. Patients were divided in 3 groups based on the severity of hyponatremia (Group A < 115 mmol/l , Group B 116-120 mmol/l and Group C 121-125 mmol/l) and 100 patients from each group were included.
Results : Showed that majority of patients belonged to age group 61-80 years (147 patients,49%). 181 patients (60.3%) were males .The commonest symptom was confusion (64.7%) followed by deep somnolence (52 %) & nausea (46.7 %).
Hypertension (50.7%) and diabetes mellitus (37 %) were commonest comorbities.
Most frequent cause of profound hyponatremia was diuretics (29 %) , followed by SIADH (15.3%) and Chronic liver disease (13.7 %).
Conclusions : The most common type was hypovolemic hypotonic followed by euvolemic hypotonic and hypervolemic hypotonic hyponatremia. Morbidity and mortality in patients with profound hyponatremia were related to underlying etiology rather than severity of hyponatremia

KEYWORDS

Hyponatremia, Diuretics, Hypotonic, Mortality.

INTRODUCTION:

Hyponatremia (serum sodium concentration <135 mmol/l) is the most common electrolyte balance encountered in clinical practice. Hyponatremia[1] is being classified according to European journal of endocrinology as mild , moderate and profound depending on serum sodium ranging between 130-135 mmol/l as mild,125-130 mmol/l as moderate, <125 mmol/l as profound. Commonly it results from either sodium losses or from water retention in body causing dilution with various hormones interplaying in the etiopathogenesis. In majority of cases hyponatremia reflects low effective osmolality or hypotonicity, which shifts the fluid in to the cell causing cellular oedema. Hyponatremia leads to clinical symptoms from subtle to severe or life threatening. Based on duration hyponatremia can be acute (<48 hours) and chronic (>48 hours).

However the early recognition and management can dramatically alters the prognosis. Moreover, apart from mortality, hyponatremia prolongs the hospital stay significantly and increases the cost of medical care substantially.

MATERIAL AND METHODS

This was a prospective study and conducted in Dayanand Medical College and Hospital, Ludhiana.

SOURCE OF DATA

300 Patients of age >18 years admitted in emergency, Medical wards, Medical ICU's and allied medical specialties of DMC&H with profound hyponatremia were enrolled for the study.

METHODS OF COLLECTION OF DATA

Patients were divided in 3 groups based on the severity of hyponatremia (Group A 121-125 mmol/l, Group B 116-120 mmol/l and group C ≤ 115 mmol/l) and 100 patients from each group were included. Serum sodium was estimated on Hitachi Cobas 6000 and Beckman Coulter AU 5800 by Ion-specific electrode in electrolyte analyzer.

Selection Process criteria is as below

INCLUSION CRITERIA

Age > 18 years

Serum sodium levels ≤ 125 mmol/l.

EXCLUSION CRITERIA

Surgical cases

DURATION OF STUDY/ NUMBER OF CASES

300 patients of age >18 years presenting to DMC&H with profound hyponatremia were enrolled for the study over a period of **15 months.**

OUTCOME

The outcome of the study was assessed on the basis of length of hospital stay, morbidity and mortality associated with profound hyponatremia.

STATISTICAL ANALYSIS

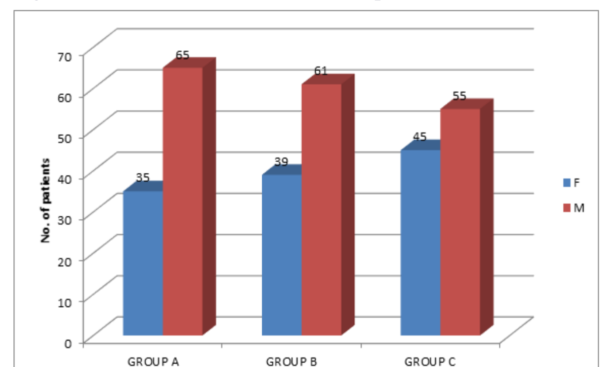
Data were described in terms of range; mean ±standard deviation (± SD), median, frequencies (number of cases) and relative frequencies (percentages) as appropriate. Comparison of quantitative variables between the study groups was done using Student t-test and *ANOVA* test. For comparing categorical data, Chi square ($\chi 2$) test was performed and exact test was used when the expected frequency is less than 5. A probability value (*p* value) less than 0.05 was considered statistically significant. All statistical calculations were done using SPSS (Statistical Package for the Social Science) SPSS 21 version statistical program for Microsoft Windows.

OBSERVATIONS AND RESULTS.

There were 100 patients in each group with age varying from 18 to >80 years. In all the 3 groups, majority of patients belonged to age group 61-80 years (147 patients, 49%), followed by 41-60 years age group (105 patients, 35%). The mean age in group A, B and C were 60.14 years, 59.32 years and 62.82 years respectively with no statistically significant difference among the 3 groups.

Out of 300 patients, 181 patients (60.3%) were males and 119 patients (39.7%) were females. Also there was a male preponderance seen in all the 3 groups with 65%, 61% and 55% in group A, B and C respectively. (Figure-1)

Figure 1: Gender wise distribution of the patients



Total 89.6% patients were found to be symptomatic with the maximum of 97% in group C, 90% in group B and 82% in group A. In all the 3 groups, majority of patients had both moderately severe & severe symptoms which were classified based on European Journal of Endocrinology guidelines for hyponatremia(Table1).

Also, there is a statistical relation between the severity of symptoms and the severity of hyponatremia. The most common symptom was confusion (194 patients, 64.7%) followed by deep somnolence (156 patients, 52%) & nausea (140 patients, 46.7%). Cardio-respiratory distress (110 patients, 36.7%) and vomiting (79 patients, 26.3%) were the other common symptoms.

Table 1: Distribution of patients on the basis of Symptoms

		Group			Total	chi-square value	p-value
		GROUP A	GROUP B	GROUP C			
SYMPTOMS	MODERATELY SEVERE	25	11	5	41	37.97	0.000
	MODERATE+ SEVERE	53	70	88	211		
	NO	18	10	3	31		
	SEVERE	4	9	4	17		
Total		100	100	100	300		

The commonest associated co-morbidity was hypertension which was seen in 152 patients (50.7%) followed by diabetes mellitus in 111 patients (37%) and CKD in 49 patients (16.3%).

Overall the most common cause of hyponatremia came out to be diuretics (29%), followed by SIADH (15.3%) and CLD (13.7%). The commonest cause in all the 3 groups separately was diuretics only (group A 9%, group B 8.7% & group C 10.7%).27 patients (9%) out of 300 had 2 or more precipitating factors as the cause of hyponatremia (Table 2)

Table 2: Distribution of patients on the basis of Etiology

		Group			Total
		GROUP A	GROUP B	GROUP C	
ETIOLOGY	FULID OVERLOAD	24	46	18	88
	DIURETICS	28	27	32	87
	SIADH	17	12	17	46
	LOW SOLUTE INTAKE	17	5	6	28
	2 OR MORE FACTORS	7	4	16	27
	HYPOCORTISOLISM	3	2	9	14
	DIARRHEA	3	1	0	4
	VOMITING	1	2	1	4
	HYPOTHYROIDISM	0	1	1	2
Total		100	100	100	300

90 patients (30%) had euvolemic hypotonic hyponatremia with SIADH (15.3%) being the most common cause followed by low solute intake (9.3%). The other causes were hypocortisolism and hypothyroidism 88 patients (29.3%) had hypervolemic hypotonic hyponatremia. CLD (41patients13.7%) was the most common cause followed by CKD (31 patients, 10.3%). Other causes were heart failure, hypoproteinemia, acute viral hepatitis and acute kidney injury. The most common type of hyponatremia was hypovolemic hypotonic type seen in 102 patients (34%), of which diuretics alone were the most common precipitating factor seen in 87 patients (29%).

Patients with CLD and CKD as the etiology of hyponatremia had significant morbidity and mortality (39% and 29% respectively) and this relation was significant in the CLD group (P=0.00). Whereas morbidity and mortality was lower in the other groups (Diuretics 18.4%, SIADH 10.9%, low solute intake 10.7% and heart failure 10%). 50% (26 patients) of the total patients who took DAMA/expired belonged to hypotonic hypervolemic hyponatremia group. Thus, morbidity and mortality was highest in this group, followed by hypotonic hypovolemic group (32.7%, 17 patients) and hypotonic normovolemic group (15.4%, 8 patients). This shows that final outcome of the patient doesn't depend upon the severity of hyponatremia but the primary cause.

DISCUSSION

Hyponatremia (serum sodium concentration <135 mmol/l) is the most prevalent electrolyte abnormality encountered in 30% of hospitalized patients.

In our study on **CLINICAL PROFILE AND OUTCOME IN PATIENTS WITH PROFOUND HYPONATREMIA**, 300 Patients of age 18 years admitted in emergency, medical wards, medical ICU's and allied medical specialties of DMC&H were included. Patients were divided in 3 groups based on the severity of Hyponatremia (Group A ≤ 115mmol/l, Group B 116-120 mmol/l and group C 121-125 mmol/l) and there were 100 patients in each group.

In all the 3 groups, majority of patients belonged to the age group 61-80 years (147 patients, 49%), followed by 41-60 years (105 patients, 35%).The mean age in groups A, B and C were 60.14 years, 59.32 years and 62.82 years respectively with no statistically significant difference among the 3 groups.

Our results matched with a prospective, observational study conducted in a tertiary care hospital by Pandey SO et al, in which hyponatremia was found to be more prevalent among elderly patients than in younger patients (age group of 61-70 years - 38.75% and 71- 80 years - 30%).[2]

In a study done by Tierney et al, the mean age of presentation was 61 years[3] whereas in a study by Renneboog et al, the mean age was 72 years.[1] Also in a cohort study of 4123 older patients by Terzian et al, the mean age of presentation was 77 years.[4]

In present study out of 300 patients, 181 patients (60.3%) were males and 119 patients (39.7%) were females. Also there was a male preponderance seen in all the 3 groups with 65%, 61% and 55% in groups A, B and C respectively.

This is in concordance with a study conducted by Chatterjee et al in a tertiary care hospital of eastern India in which there were 126 (62.69%) male patients and 75 (37.31%) female patients.[5]

In our study out of 300 patients, total 269 (89.6%) patients were found to be symptomatic with the maximum of 97% in group C, 90% in group B and 82% in group A. Majority had both moderately severe and severe symptoms (211 patients, 70.33%) with confusion being the most common (194 patients, 64.7%), followed by deep somnolence (156 patients, 52%) & nausea (140 patients, 46.7%). Cardio-respiratory distress (110 patients, 36.7%) and vomiting (79 patients, 26.3%) were the other common symptoms. Headache, seizures and coma were present in 10.66%, 7% and 5% of the patients respectively.

This is in concordance with a study by Mahavir et al in which they observed that the common symptoms associated with hyponatremia were confusion (41%), headache (40%) and malaise (38.6%).[6]

In our study, the commonest associated co-morbidity was hypertension which was seen in 152 patients (50.7%) followed by diabetes mellitus in 111 patients (37%) and CKD in 49 patients (16.3%). CLD and CAD both were seen in 32 patients (10.66%) each. Hypothyroidism was seen in 17 patients (5.66%) whereas Bronchial Asthma was seen only in 11 patients (3.66%).

This is in concordance with a study by Rao et al, in which the common co-morbid conditions were Hypertension (62%), diabetes mellitus (51%), renal failure (22%) and ischemic heart disease (18%).[7]

In our study, the most common cause of hyponatremia came out to be diuretics (29%), followed by SIADH (15.3%) and CLD (13.7%). The commonest cause separately in all the 3 groups was diuretics only (group A 9%, group B 8.7% & group C 10.7%). 27 patients (9%) had 2 or more precipitating factors as the cause of hyponatremia. The most common type of hyponatremia was hypovolemic hypotonic type seen in 102 patients (34%), of which diuretics alone were the most common precipitating factor seen in 87 patients (29%). Other causes were diarrhea and vomiting. 90 patients (30%) had euvolemic hypotonic hyponatremia with SIADH (15.3%) being the most common cause followed by low solute intake (9.3%). The other causes of euvolemic hypotonic hyponatremia were hypocortisolism and hypothyroidism. 88 patients (29.3%) had hypervolemic hypotonic hyponatremia. CLD (41patients, 13.7%) was the most common cause followed by CKD (31 patients, 10.3%). Other causes included heart failure, hypoproteinemia, acute viral hepatitis and acute kidney injury.

Our results are in concordance with a study on "Prevalence, Incidence and Etiology of Hyponatremia in Elderly Patients with Fragility Fractures" by Cumming et al, in which Hypovolemic hyponatremia was the most predominant (69.7%) followed by euvolemic (27.3%) and hypervolemic (3%) hyponatremia. And the commonest potentially causative factor in their study was thiazide diuretics (76%).[8]

Maqbool et al in a study on "SYMPTOMATIC HYPONATREMIA, ETIOLOGY AND OUTCOME IN A TERTIARY CARE HOSPITAL" found that, diuretic use was the most common cause of hyponatremia (34%), followed by SIADH (29%), gastrointestinal losses (10%) and chronic kidney disease (8%). Chronic liver disease and chronic heart failure contributed 6% each. Other rare causes like hypothyroidism, primary adrenal failure, primary polydipsia and Beer potomania were found in 7% of patients.[9]

Patients with CLD and CKD as the etiology of hyponatremia had significant morbidity and mortality (39%and 29% respectively) and this relation was significant in the CLD group (P=0.00). Whereas morbidity and mortality were comparatively lower in the other groups (Diuretics 18.4%, SIADH 10.9%, low solute intake 10.7% and heart failure 10%). 50% (26 patients) of the total patients who took DAMA/ expired belonged to hypotonic hypervolemic hyponatremia group.

Thus, morbidity and mortality in patients with profound hyponatremia is related to the underlying etiology rather than the severity of hyponatremia.

Finally in a study in Dehradun on hyponatremia in elderly population, Kaeley et al found that hyponatremia contributes to morbidity and mortality, however, the severity of hyponatremia is not related to an increase in mortality.[10]

REFERENCES

1. Spasovski G, Vanholder R, Allolio B, Annane D, Ball S, Bichet D, et al. Clinical practice guideline on diagnosis and treatment of hyponatraemia. European Journal of Endocrinology. 2014;170:G1-47.
2. Pandey SO, Shah PP. Study of spectrum of neurological manifestations in patients with hyponatremia: A prospective, observational study in a tertiary care hospital. Sch. J. App. Med. Sci. 2017;5:1333-42.
3. Tierney WM, Martin DK, Greenlee MC, Zerbe RL, McDonald CJ. The prognosis of hyponatremia at hospital admission. J Gen Intern Med. 1986;1:380-5.
4. Terzian C, Frye EB, Piotrowski ZH. Admission hyponatremia in the elderly-Factors influencing prognosis. J Gen Intern Med. 1994;9:89-91.
5. Chatterjee N, Sengupta N, Das C, Chowdhuri AR, Basu AK, Pal SK. A descriptive study of hyponatremia in a tertiary care hospital of Eastern India. Indian J Endocrinol Metab. 2012;16:288-91.
6. Agarwal SM, Agrawal A. A comparative study of the clinico-aetiological profile of hyponatremia at presentation with that developing in the hospital. Indian J Med Res. 2011;134:118-22.
7. Rao MY, Sudhir U, Anil Kumar T, Saravanan S, Mahesh E, Punith K. Hospital based descriptive study of symptomatic hyponatremia in elderly patients. J Assoc Physicians India. 2010;58:667-9.
8. Cumming K, Hoyle GE, Hutchison JD, Soiza RL. Prevalence, Incidence and Etiology of Hyponatremia in Elderly Patients with Fragility Fractures. PLOS ONE. 2014;9:E88272.
9. Maqbool M, Raina AA, Mir BA, Rafi A, Shah PA. Symptomatic hyponatremia, etiology and outcome in tertiary care hospital. Int. J. Adv. Res. 2016;4:1781-4.
10. Kaeley N, Akram M, Ahmad S, Bhatt N. Hyponatremia in Elderly – Its Prevalence, Aetiology and Outcome. Ann. Int. Med. Den. Res. 2017;3:16-19.