CLINICAL PROFILE OF HYPONATRAEMIA IN A TERTIARY CARE HOSPITAL

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ABSTRACT

BACKGROUND

Hyponatraemia is the most common electrolyte disorder among hospitalised patients occurring in upto 22% of hospitalised patients.[1] David B Mount defined hyponatraemia as a serum sodium concentration (Na^+) less than 135 mEq/L.

The aim of this study is to describe the clinical profile of hyponatraemia in patients admitted to Acharya Vinoba Bhave Rural Hospital, Sawangi, Wardha. There is limited information about the clinical profile of hyponatraemia in rural areas.

MATERIALS AND METHODS

This prospective observational hospital-based study was conducted from September 2014-August 2016 at AVBRH, Sawangi, Wardha. A total of 100 cases with serum sodium level <135 mEq/L were studied. History and clinical examinations were recorded in all patients. Necessary laboratory and radiological investigations were done.

RESULTS

The incidence of hyponatraemia in our study was 7.2 percent 60 cases were males and 40 cases were females. Hyponatraemia was commonly observed in the age group of 51-70 years in both the groups. 31 patients were mild hyponatraemia, 55 patients were moderate hyponatraemia, 14 patients were severe hyponatraemia, 55 patients had euvolaemia, 24 patients had hypovolaemia and 21 patients had hypervolaemia. Euvolaemic moderate-grade hyponatraemia was most commonly observed 26 cases (26%). The most common clinical features were altered sensorium (46%) and hypertension (36%). Both were common in severe hyponatraemia. Euvolaemic hyponatraemia (55 patients) was most common in our study. Further SIADH was the most common diagnosis among this group of patients. The most common aetiology was cerebrovascular episode (38%). The mortality was found to be 10% in this study. The mortality was found to be higher in euvolaemic hyponatraemia (12.72%).

CONCLUSION

Hyponatraemia was more common in the elderly age group. Among neurological causes, cerebrovascular episode was the commonest. Most of the patients in the study were found to have euvolaemic hyponatraemia (55%). SIADH was the commonest cause of hyponatraemia in our study. The mortality was higher in euvolaemic hyponatraemia. We also conclude that all the patients with altered sensorium should be evaluated for hyponatraemia even when they have underlying neurological disease. Treatment of comorbid disease in case of hyponatraemia is equally important.

KEYWORDS

Euvolaemia, Hypervolaemia, Hyponatraemia.

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BACKGROUND

Hyponatraemia is the most common electrolyte disorder among hospitalised patients occurring in upto 22% of hospitalised patients.[1] David B Mount defined hyponatraemia as a serum sodium concentration (Na^+) less than 135 mEq/L.[1]

Hyponatraemia is subdivided diagnostically into three groups on clinical history and volume status.[2]

1. Hypovolaemic hyponatraemia.
2. Euvolaemic hyponatraemia.
3. Hypervolaemic hyponatraemia.

Why this Study in Rural Area?

Data regarding the incidence of hyponatraemia in elderly in our country is limited. This study is done to know the common clinical features and aetiology of hyponatraemia in adult hospitalised patients and to study the morbidity and mortality in patients in rural areas. The incidence is much more in elderly mainly owing to impaired ability to maintain water and electrolyte homeostasis in response to diet, drugs and environmental changes. Hence, this study was planned in our setup to actually find out clinical profile of hyponatraemia in rural areas.

The study would analyse the following parameters-

- Incidence of hyponatraemia in hospitalised patients in rural areas.
- Hyponatraemia in relation to age and sex of patients in rural areas.
- Causes of hyponatraemia and various types and severity of hyponatraemia.
- Correlating the outcome of patients with serum sodium levels.
- Underlying comorbid diseases presenting with hyponatraemia.

It was a prospective observational study. This study was conducted from September 2014 to August 2016 at AVBRH, Sawangi, Wardha. 100 cases of hyponatraemia admitted in medicine wards and MICU.

- **Complete Clinical Profile was Studied Under the Following Heads**- History, clinical examination, necessary laboratory and radiological investigations. Those cases fulfilling the inclusion criteria were asked to participate after getting an informed written consent. Patients admitted with serum sodium level less than 135 mEq/L, age of patients >18 yrs. were included.

Determination of Serum Osmolarity-

Plasma osmolality can be calculated using the following formula.[3]

- Calculated serum osmolality = (2x serum (Na)) + (glucose in mg/dL)/18 + (blood urea nitrogen in mg/dL)/2.8.

Syndrome of inappropriate antidiuretic hormone is diagnosed by following criteria.[4,5]

Essential Criteria

1. Hypo-osmolality (plasma osmolality <270 mOsm/kg).
2. Inappropriately concentrated urine (>100 mOsm/kg).
3. Clinical euvolaemia.
4. Elevated urine sodium (>40 mEq/L) with normal salt and water intake.
5. Euvolaemia with normal adrenal, thyroid, renal and liver functions.

Statistical Method

The data was statistically analysed using the standard tests to ascertain the clinical relevance of the study.

Statistical analysis was done by using descriptive and inferential statistics using Chi-square test and one-way ANOVA and software used in the analysis were SPSS 17.0 version, Epi-Info and GraphPad Prism 5.0 version and $p<0.05$ is considered as level of significance ($p<0.05$). Z test used for single proportion and z value >1.96 is considered as level of significance.

Observations and Results

The incidence of hyponatraemia in our study was 7.2 percent. Hyponatraemia in our study was classified according to severity as follows-

Mild hyponatraemia is defined as the serum sodium concentration (Na+) of 126-135 mEq/L. Moderate hyponatraemia is defined as serum sodium concentration (Na+) of 116-125 mEq/L. Severe hyponatraemia is defined as serum sodium concentration (Na+) of less than 115 mEq/L.

	Mild 126-135 mEq/L (n=31)	Moderate 116-125 mEq/L (n=55)	Severe <115 mEq/L (n=14)	p-value
Age	56.29 ± 13.54	54.85 ± 16	53.07 ± 18.89	0.810, NS
Sex				
Male	17 (54.84%)	35 (63.64%)	8 (57.14%)	0.707, NS
Female	14 (45.16%)	20 (36.36%)	6 (42.86%)	
Oedema	8 (25.80%)	10 (18.18%)	4 (28.57%)	3.51, p=0.17, NS
Dehydration	4 (12.90%)	4 (7.27%)	2 (14.28%)	2.85, p=0.24, NS
Hypotension	5 (16.12%)	2 (3.63%)	2 (14.28%)	7.82, p=0.02, S
Hypertension	12 (38.70%)	16 (29.09%)	8 (57.14%)	16.67, p=0.007, S
Flapping tremors	2 (6.45%)	1 (1.81%)	1 (7.14%)	2.94, p=0.22, NS
Altered sensorium	17 (54.83%)	20 (36.36%)	9 (64.28%)	16.36, p=0.0003, S
Fever	7 (22.58%)	8 (14.54%)	2 (14.28%)	3.39, p=0.18, NS
CNS abnormalities	9 (29.03%)	23 (41.81%)	6 (42.85%)	5.17, p=0.07, NS
Ascites	5 (16.12%)	4 (7.27%)	3 (21.42%)	8.04, p=0.017, S
Sepsis	6 (19.35%)	7 (12.72%)	2 (14.28%)	1.59, p=0.14, NS
CKD	6 (19.35%)	14 (25.45%)	3 (21.43%)	1.10, p=0.57, NS
Serum osmolality	242.77 ± 16.73	244.29 ± 17.76	246.07 ± 16.31	0.18, p=0.38, NS
Urinary sodium	60.58 ± 26.34	50.01 ± 30.10	51.57 ± 30.21	1.35, p=0.26, NS
Mortality	2 (6.45%)	6 (10.90%)	2 (14.28%)	3.52, p=0.17, NS

Table 1. Shown Baseline Characteristics Stratified by Severity of Hyponatraemia

S = Significant; NS = Nonsignificant.

	Age	Male	Female	א2-value
1.	18-30	8 (13.33%)	3 (7.5%)	2.15, p=0.54, NS
2.	31-50	20 (33.34%)	10 (25%)	
3.	51-70	23 (38.34%)	20 (50%)	
4.	71 and above	9 (15%)	7 (17.5%)	
	Total	**60 (60%)**	**40 (40%)**	
Mean Age		53.55 ± 16.30	57.30 ± 14.37	

Table 2. Age Distribution

	Symptom	Hyponatraemia			Cases	א2-value
		Mild 126-135 mEq/L (n=31)	Moderate 116-125 mEq/L (n=55)	Severe <115 mEq/L (n=14)		
1.	Drowsiness	15 (48.38%)	17 (30.90%)	4 (28.57%)	36 (36%)	9.46, p=0.023, S
2.	Focal neurodeficit	16 (51.61%)	20 (36.36%)	2 (14.28%)	38 (38%)	32.53, p=0.0001, S
3.	Disorientation	8 (25.80%)	10 (18.18%)	4 (28.57%)	22 (22%)	3.79, p=0.28, NS
4.	Vomiting	6 (19.35%)	9 (16.36%)	2 (14.28%)	17 (17%)	1.79, p=0.61, NS
5.	Headache	6 (19.35%)	8 (14.54%)	-	14 (14%)	19.36, p=0.0002, S
6.	Convulsion	4 (12.90%)	5 (9.09%)	3 (21.42%)	12 (12%)	6.64, p=0.28, NS
7.	Breathlessness	3 (9.67%)	4 (7.27%)	2 (14.28%)	9 (9%)	2.88, p=0.40, NS
8.	Cough	2 (6.45%)	5 (9.09%)	1 (7.14%)	8 (8%)	0.72, p=0.86, NS
9.	Cramps	4 (12.90%)	3 (5.45%)	-	7 (7%)	14.81, p=0.002, S
10.	Chest pain	2 (6.45%)	4 (7.27%)	-	6 (6%)	7.18, p=0.07, NS
11.	Loose stool	1 (3.22%)	2 (3.63%)	1 (7.14%)	4 (4%)	2.09, p=0.55, NS

Table 3. Study Association of Symptoms with Severity Hyponatraemia is Given

	Clinical Feature	Hyponatraemia			Cases	p-value
		Mild 126-135mEq/L (n=31)	Moderate 116-125mEq/L (n=55)	Severe <115mEq/L (n=14)		
1.	Altered sensorium	17 (54.83%)	20 (36.36%)	9 (64.28%)	46 (46%)	15.86, p=0.001, S
2.	Fever	7 (22.58%)	8 (14.54%)	2 (14.28%)	17 (17%)	3.82, p=0.28, NS
3.	Tachycardia	9 (29.03%)	11 (20%)	3 (21.42%)	23 (23 %)	2.73, p=0.43, NS
4.	Hypertension	12 (38.70%)	16 (29.09%)	8 (57.14%)	36 (36%)	17.74, p=0.0005, S
5.	Hypotension	5 (16.12%)	2 (3.63%)	2 (14.28%)	9 (9%)	9.04. p=0.028, S
6.	Dehydration	4 (12.90%)	4 (7.27%)	2 (14.28%)	10 (10%)	3.06, p=0.28, NS
7.	Oedema	8 (25.80%)	10 (18.18%)	4 (28.57%)	22 (22%)	3.79, p=0.28, NS

Table 4. Shows Association of Clinical Features with Severity of Hyponatraemia

	Aetiology	Cases
1.	Euvolaemic hyponatraemia (n=55)	
A	CVE	38 (69%)
B	Meningitis	1 (1.81%)
C	Seizure disorder	12 (21.81%)
D	Pneumonia	1 (1.81%)
E	Tuberculosis	3 (5.45%)
2.	Hypovolaemic hyponatraemia (n=24)	
A	Fluid loss due to diarrhoea and vomiting	17 (70.83%)
B	Diuretics induced hyponatraemia	7 (29.16%)
3.	Hypervolaemic hyponatraemia (n=21)	
A	CCF	2 (9.52%)
B	Cirrhosis of liver	9 (42.85%)
C	Renal failure	10 (47.61%)

Table 5. Clinical Impression for Aetiology in Cases of Hyponatraemia is Given

	Euvolaemic (n=55)	Hypovolaemic (n=24)	Hypervolaemic (n=21)	p-value
Serum osmolality mOsm/kg	237.45 ± 16.34	253.25 ± 10.38	250.90 ± 18.30	11.11, p=0.0001, S
Urinary Na mEq/L	76.09 ± 18.23	23.87 ± 7.75	28.23 ± 10.09	141.89, p=0.0001, S

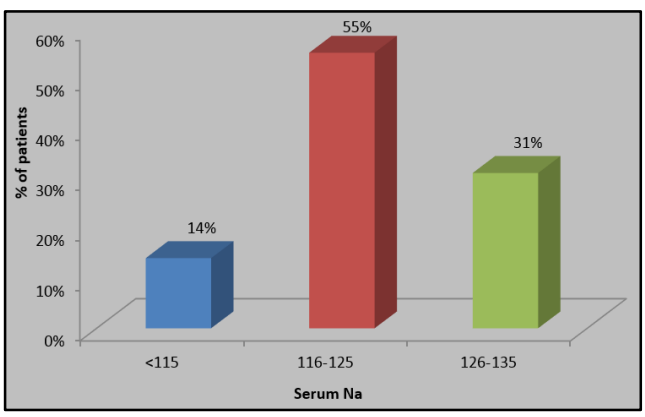
Table 6. Association of Serum Osmolality and Urinary Sodium with Type of Hyponatraemia is Given

Hyponatraemia	Number of Patients (n=100)	Outcome Mortality (n=10)
Mild 126-135 mEq/L	31 (31%)	2 (6.45%)
Moderate 116-125 mEq/L	55 (55%)	6 (10.90%)
Severe <115 mEq/L	14 (14%)	2 (14.28%)
א2-value	13.68, p-value=0.0011, S	

Table 7. Study the Mortality in Relation to Hyponatraemia is Given

Hyponatraemia	Number of Patients (n=100)	Outcome Mortality (n=10)
Euvolaemic hyponatraemia	55 (55%)	7 (12.72%)
Hypovolaemic hyponatraemia	24 (24%)	1 (4.16%)
Hypervolaemic hyponatraemia	21 (21%)	2 (9.52%)
א2-value	3.24, p=0.19, NS	

Table 8. Mortality in Relation to Type of Hyponatraemia is Given



Graph 1. Lab Investigation in Cases of Hyponatraemia (n=100)

DISCUSSION

Incidence in the present study- In the present study, the incidence was 7.2% as compared to 14.3% in the study done by Van Dijken GD, Blom RE et al.[6]

Gosch M, Joosten Gstrein B et al reported a value of 16.7% as an incidence in their study.[7]

Distribution of Cases According to Baseline Characteristics

The most commonly observed characteristics were altered sensorium and hypertension, which were statistically significant. Hypertension was commonly observed in the patients of severe hyponatraemia 8 (57.14%) as compared to mild and moderate hyponatraemia. Altered sensorium was commonly observed in mild 17 (54.83%) and severe hyponatraemia 9 (64.28%). Hypotension was commonly noted in mild hyponatraemia 5 (16.12%). Ascites was common in severe hyponatraemia 3 (21.42%).

Ivor Douglas reported altered sensorium in 86 cases (51.7%) in 168 hospitalised patients with severe hyponatraemia.[8] Panicker, Georgy Itty, S. Joseph et al reported that once the level of serum sodium falls below 125 mEq/L neurologic symptoms predominate. Clinical signs included abnormal sensorium are seen in patients with serum sodium levels below 125 mEq/L.[9]

Distribution of Cases of Hyponatraemia in Relation to Type and Severity

Based on serum sodium concentration, hyponatraemia was classified as mild, moderate and severe with serum sodium 126-135 mEq/L, 116-125 mEq/L and less than or equal to 115 mEq/L, respectively. Out of 100 cases of hyponatraemia, 31 had mild hyponatraemia, 55 had moderate hyponatraemia and 14 had severe hyponatraemia.

The hydration status of the patients was diagnosed on the basis of clinical examination and was divided into euvolaemic, hypovolaemic and hypervolaemic states. 55 patients had euvolaemia, 24 patients had hypovolaemia and 21 patients had hypervolaemia.

Euvolaemic hyponatraemia was commonly observed (55%) as compared to hypovolaemic and hypervolaemic hyponatraemia. Hyponatraemia of moderate grade was commonly noted as compared to mild and severe grade hyponatraemia. Euvolaemic moderate grade hyponatraemia was most commonly observed 26 cases (26%). Similar result was found in the study by Nandakumar, Hiremath P. B et al,[10] Aqeel Raheem and AL-Barqawi et al.[11]

Age Distribution- Age group of cases was between 18-85 years. The underlying systemic diseases like diabetes mellitus, CVE and liver cirrhosis are common in this age group. Hyponatraemia was noted at all ages.

In our present study, age group studied is correlating well with study group of Aqeel Raheem, AL-Barqawi et al,[11] Rahil A I and Khan F Y et al.[12]

Mean Age Distribution- Mean age of cases studied was 55.05 ± 15.59 years. At this age, patients usually have some associated risk factors or pre-existing comorbid conditions like diabetes, hypertension, CVE, etc. In this present study, hyponatraemia was more commonly seen in elderly age group (51-70 years). The various factors responsible for hyponatraemia in elderly are decreased glomerular filtration rate, impaired ability of kidney to conserve sodium, increased release of arginine vasopressin to a given osmotic stimulus, various drugs taken by them, decreasing appetite and concomitant illnesses.

Our study mean age correlates with study of Nandakumar, Hiremath P.B et al,[10] Rahil A I and Khan F Y et al.[12]

Gender Wise Distribution- Of total 100 cases, male constituted 60 cases and a female constituted 40 cases. Male-to-female ratio was 1.5:1. In general, in our hospital population, there were more males than females. Hence, this slight increase in males was not very significant. This ratio was more or less constant in all age groups. Hyponatraemia was commonly observed in the age group of 51-70 years in both males and females.

Our study correlates well with Nandakumar, Hiremath P. B et al,[10] Rahil A I, Khan F Y et al,[12] Nandini Chatterjee, Nilanjan Sengupta et al.[13]

Distribution of Cases According to Symptoms in Cases of Hyponatraemia

The symptoms varied from gastrointestinal symptoms to neurological symptoms. In this study, neurological symptoms were common than gastrointestinal symptoms. This was because of underlying comorbid conditions like CVE and CKD. Few patients reached this hospital with gastroenteritis as it was managed peripherally. Many patients had more than one symptoms. In this study, the common symptoms were drowsiness, focal neurological deficit and disorientation. Vomiting was the most common gastrointestinal symptom. Drowsiness (36%), focal neurological deficit (38%) and disorientation (22%) were common neurological symptoms in our study. Vomiting (17%) was most common gastrointestinal symptom. Many of the symptoms were attributed to the coexisting parent disease.

Nandakumar, Hiremath P.B et al reported drowsiness was the commonest symptom in their study. Vomiting, seizures and hiccoughs were each seen in about 10% of the patients.[10] Aqeel Raheem, AL-Barqawi et al reported that symptoms attributable to hyponatraemia such as mental confusion, anorexia, nausea, vomiting and headache are nonspecific.[11]

Distribution of Cases According to Severity of Hyponatraemia and Symptomatology

The symptoms varied from gastrointestinal symptoms to neurological symptoms. In this study, neurological symptoms were common than gastrointestinal symptoms. This was because of underlying comorbid conditions like CVE and CKD. Few patients reached this hospital with gastroenteritis as it was managed peripherally. Many patients had more than one symptoms. In this study, the common symptoms were drowsiness, focal neurological deficit and disorientation. Vomiting was the most common gastrointestinal symptom. Drowsiness 15 (48.38%), focal neurological deficit 16 (51.61%), vomiting 6 (19.35%), cramps and headache were more common in mild hyponatraemia. Disorientation 4 (28.57%), convulsion 3 (21.42%) were more common in severe hyponatraemia. Hence, we conclude the more severe the hyponatraemia, more severe the symptoms. Many of the symptoms were attributed to the coexisting parent disease.

Our study correlates well with Nandakumar, Hiremath P. B et al,[10] Rahil A I, Khan F Y et al,[12] Hochman I, Cabili S et al.[14]

Distribution of Cases According to Comorbid Conditions of Patients

In the present study, systemic hypertension 29 cases (29%) and diabetes mellitus 16 cases (16%) were commonest comorbid conditions in cases of hyponatraemia, which was statistically significant as compared to other comorbid conditions.

Our study correlates well with Nandakumar, Hiremath P.B et al,[10] J. R. Rawal,[15] H. S. Joshi et al,[15] Sumit Mohan, Sue Gu et al.[16]

Distribution of cases according to clinical features of patients.

In the present study, the most common clinical feature in this study was altered sensorium (46%) and hypertension (36%).

Our study correlates well with J. R. Rawal[15], H. S. Joshi et al,[15] Sumit Mohan, Sue Gu et al.[16]

Distribution of cases according to clinical features of patients associated with severity of hyponatraemia.

In the present study, the most common clinical feature in this study was altered sensorium (46%) and hypertension (36%). Altered sensorium 9 (64.28%) cases, hypertension 8 (57.14%) cases, dehydration 2 (14.28%) cases and oedema 4 (28.57%) cases were common in severe hyponatraemia.

Our study correlates well with J. R. Rawal,[15] H. S. Joshi et al,[15] Sumit Mohan, Sue Gu et al,[16] Wheaton NB, Didwania AK et al.[17]

Distribution of Cases According to Aetiology in Cases of Hyponatraemia

Euvolaemic Hyponatraemia

This was noted in 55 cases (55%) of hyponatraemia. Euvolaemic hyponatraemia was seen in 38 cases of CVE, 1 case of meningitis, 12 cases of seizure disorder, 1 case of lobar pneumonia and 3 cases of tuberculosis. Among 55 patients with euvolaemic hyponatraemia, 38 (69%) patients had cerebrovascular episode and 12 (21.81%) patients had seizure disorder. Hence, most common cause of euvolaemic hyponatraemia was cerebrovascular episode.

Hypovolaemic Hyponatraemia

This was noted in 24 cases (24%) of hyponatraemia. Hypovolaemic hyponatraemia was seen in 17 cases of acute gastroenteritis (fluid loss due to vomiting, loose stools) and 7 cases of diuretic (furosemide) induced hyponatraemia. Acute gastroenteritis (fluid loss due to diarrhoea and vomiting) 70.83% was most common in hypovolaemic hyponatraemia.

Hypervolaemic Hyponatraemia

This was noted in 21 cases (21%) of hyponatraemia studied Hypervolaemic hyponatraemia was seen in 2 cases of CCF, 9 cases of cirrhosis of liver with portal hypertension and 10 cases of CKD with fluid overload. Thus, heart failure, hepatic cirrhosis and CKD were underlying diseases. Renal failure 47.61% was most common in hypervolaemic hyponatraemia.

In this present study, euvolaemic hyponatraemia was most common comprising 55% of cases. The most common cause of hyponatraemia was cerebrovascular episode (38%), the second most common cause was fluid loss due to diarrhoea and vomiting (17%) and the third most common cause was seizure disorder (12%). Similar result

was found in a study conducted by Aqeel Raheem, AL-Barqawi et al,[11] Nandini Chatterjee, Nilanjan Sengupta et al.[13]

Distribution of Cases According to Serum Osmolarity and Urinary Sodium Associated with Type of Hyponatraemia

Serum osmolarity was determined in all 100 cases of hyponatraemia by the formula.[3] Serum osmolarity was lowest in euvolaemic hyponatraemia (237.45 ± 16.34 mmol/L). Serum osmolarity was 253.25 ± 10.38 mmol/L in hypovolaemic hyponatraemia. Cases with hypervolaemic hyponatraemia had highest serum osmolarity of 250.90 ± 18.30 mmol/L. The difference in osmolarity in this three groups was statistically very highly significant. Mean serum osmolarity in cases with SIADH was 237.45 ± 16.34 mmol/L. All these patients had osmolarity less than 270 mOsm/kg.[4,5]

Urinary excretion of sodium was lowest in hypovolaemic hyponatraemia (23.87 ± 7.75) and it was highest in euvolaemic hyponatraemia (76.09 ± 18.23). The difference between euvolaemic versus hypervolaemia was very highly significant as per the criteria of SIADH.[4,5] All the patients of SIADH had urinary sodium <40 mEq/L.

Mean serum osmolarity and urinary sodium excretion did not correlate with severity of hyponatraemia. However, statistically significant difference noted when parameters were studied in euvolaemic, hypovolaemic and hypervolaemic hyponatraemia.

Distribution of Cases, which Fulfil SIADH Diagnostic Criteria[4,5]

55 patients fulfilled SIADH criteria in this study. All euvolaemic patients had serum osmolality less than 270 mOsm/kg, urine sodium more than 40 mEq/L and normal renal and liver functions. Urinary osmolality could not be done due to technical problem. SIADH was the most common diagnosis among this group of patients. The most common underlying comorbid state was cerebrovascular episode. Similar result was found in the study by Nandakumar, Hiremath P. B et al,[10] Rahil A I, Khan F Y et al,[12] Nandini Chatterjee, Nilanjan Sengupta et al.[13]

Distribution of Cases According to Mortality Associated with Severity of Hyponatraemia

In this present study, the mortality was 10%. Among 31 patients of mild hyponatraemia, 2 (6.45%) patients died. Among 55 patients of moderate hyponatraemia, 6 (10.90%) patients died. Among 14 patients of severe hyponatraemia, 2 (14.28%) patients died. The mortality was higher in cases with severe hyponatraemia. However, mortality could also be attributed to the underlying comorbid conditions.

Rahil A I, Khan F Y et al[12] reported mortality as 11.3%, which correlates with our study. Chawla A, Sterns RH et al[18] formulated an interesting hypothesis that patients with moderate hyponatraemia had more severe underlying disease than those with severe hyponatraemia and therefore higher mortality rates. They did not give any reason for the same.[18]

Distribution of Cases According to Mortality Associated with Type of Hyponatraemia

Among 55 patients of euvolaemic hyponatraemia, 7 (12.72%) patients died. Among 24 patients of hypovolaemic hyponatraemia, 1 (4.16%) patients died. Among 21 patients of hypervolaemic hyponatraemia, 2 (9.52%) patients died. The mortality was found to be higher in euvolaemic hyponatraemia (12.72%). But, there were no other relevant studies conducted, which related to type of hyponatraemia and mortality.

CONCLUSION

Hyponatraemia was more common in the elderly age group. Among neurological causes, cerebrovascular episode was the commonest. Most of the patients in the study were found to have euvolaemic hyponatraemia (55%). SIADH was the commonest cause of hyponatraemia in our study. The mortality was higher in euvolaemic hyponatraemia. We also conclude that all the patients with altered sensorium should be evaluated for hyponatraemia even when they have underlying neurological disease. Treatment of comorbid disease in case of hyponatraemia is equally important.

LIMITATIONS

- Small sample size is a limitation of our study.
- In our study, urine osmolarity was not studied because of some technical difficulties.
- Proper data of drugs causing hyponatraemia was not available with patients, so apart from diuretic (furosemide) other drugs causing hyponatraemia were not included in our study.

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