

HYPERNATREMIA AND ACUTE NEUROPSYCHIATRIC DISTURBANCES*¹Dr. Alisha S. Patil, ²Dr. Priya Chugh and ³Dr. Sanjiv S. Kale¹(Junior Resident), Dept. of Psychiatry, D.Y. Patil Medical College, Navi Mumbai.²(Junior Resident), Dept. of Psychiatry, D.Y. Patil Medical College, Navi Mumbai.³(Professor and HOD), Dept. of Psychiatry, D.Y. Patil Medical College, Navi Mumbai.***Corresponding Author: Dr. Alisha S. Patil**

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ABSTRACT

Disorders in the homeostasis of serum sodium are relatively common in elderly hospitalized patients and if undetected can lead to an array of life-threatening manifestations and pose as a challenge to the management of the patients. Behavioural disturbances, though common with hyponatremia, are rare with increased serum sodium. Hyponatremia often presents with a non-specific clinical symptoms and is noticed in the extremes of ages. Severe signs of hyponatremia include lethargy, somnolence and coma all of which pose as a serious threat to the patient. In this case series we present 20 cases, all of whom are patients who presented with behavioural disturbances or psychiatric symptoms later found to be a consequence of increased serum sodium. This case series highlights that an underlying diagnosis of hyponatremia can often be missed for a psychiatric illness due to its rare clinical presentation in some patients.

KEYWORDS: Hyponatremia, irritability, Neuro-Psychiatric manifestations, Behavioural disturbances.**INTRODUCTION**

Sodium Homeostasis is one of the most important mechanisms in the body and is required for regulation of the bodily functions. Serum sodium concentration greater than 145meq/L is defined as hyponatremia.^[1-5] Hyponatremia happens because of imbalance between the water loss and the solute loss. Free water loss greater than the solute loss in the body leads to a subsequent rise of serum sodium levels in the body leading to hyponatremia.^[1]

Common causes of hyponatremia include excessive sweating secondary to vigorous exercise or fever, Central and nephrogenic diabetes insipidus or can be associated with the use of osmotic or loop diuretics. Hyponatremia in the hospital setting can occur due to excessive use of corrective or concentrated intravenous fluid infusions, salt capsules, refusal or hesitancy to drink water or secondary to the effect of certain medications.^{[1][6][7]}

Hyponatremia is commonly seen in the elderly as well as infants especially presenting with neurological impairments. Individuals can be asymptomatic or can present with severe symptoms like seizures, lethargy, somnolence, and coma, all of which require urgent detection and management.^[1] Clinical signs such as tremors, brisk tendon reflexes may also be seen.^[8]

Disorders of sodium imbalance often mimic symptoms of psychiatric illnesses which can lead to misdiagnosis

and untimely management of the underlying conditions. Although Irritability is one of the common neuropsychiatric manifestations of hyponatremia, other behavioural disturbances are relatively uncommon in the patients.^[8]

This case series of 20 cases aims to highlight the unusual psychiatric manifestations and behavioural disturbances which can mask the underlying hyponatremia due to its rare clinical presentation in certain individuals.

METHOD

A retrospective review of the patients referred to the department of psychiatry for behavioural disturbances or any other psychiatric symptoms was done in the past 6 months and 20 patients between the age groups of 20 to 95 years of age with a serum sodium level of >145meq/L were selected for evaluation.

RESULT AND DISCUSSION

About 20 patients were reviewed who had a serum sodium of (>145mEq/L) out of which majority were female (75%) and >60 years of age (45%), having comorbid medical illness (50%), presenting with Irritability as the commonest neuropsychiatric manifestation (95%) followed by sleep disturbances(85%) and confusion(60%). Most of the patients had serum sodium levels which can be categorized as moderate (150-169) mEq/L.

Table 1 summarizes the clinical characteristics of the patients.

Table 1: Characteristics of the patients (Clinical features, treatment, Outcome).

Patient no.	Age	Sex	Serum sodium (mEq/L)	Medical comorbidity	Psychiatric comorbidity	Behavioural/ Psychiatric Symptom	Correction Given for Serum Sodium	Psychotropic Medications Given for behavioural Control	Outcome/ Resolution of symptoms (approximately in)
1	79	F	152	Atrial Fibrillation COPD	no	Irritability, Confusion, Sleep disturbances	No	Risperidone	Yes,5 days
2	53	M	153	no	no	Irritability, Confusion, Sleep disturbances	No	Quetiapine	Yes, 7 days
3	28	F	160	Wernicke's Encephalopathy Amenorrhea (Pregnancy)	no	Irritability, Confusion, Sleep disturbances	Yes	Trifluoperazine	Yes,3 days
4	71	F	156	Diabetes Mellitus and Hypertension	schizophrenia	Irritability, Confusion, Sleep disturbances	No	None	Yes, 12 days
5	80	M	160	no	Brief psychotic disorder	Sleep disturbances Irritability	No	Olanzapine	Yes, 5 days
6	55	F	156	COPD	no	Irritability, Confusion, Sleep disturbances	Yes	Amisulpride	Yes,3 days
7	72	F	150	Intestinal obstruction	no	Irritability	No	None	Yes, 12 days
8	40	F	153	RHD with AS	No	Irritability	Yes	None	Yes,3 days
9	92	M	149	Pneumonia, Pre renal AKI ,Iatrogenic Enteritis and Metabolic Acidosis	No	Irritability, Confusion, Sleep disturbances	No	Olanzapine	Yes,5 days
10	39	M	151	Alcohol Withdrawal	Alcohol Dependence	Irritability Confusion Sleep disturbances Anger outbursts	No	Lorazepam Haloperidol	Yes,5 days
11	31	F	152	Post operative laparotomy	No	Irritability, Confusion, Sleep disturbances	No	Olanzapine	Yes,7 days
12	20	F	150	No	Major Depressive disorder with deliberate self-harm	Sadness of mood, Suicidal ideation	Yes, Kept NBM for 2 days	Escitalopram Clonazepam	No Resolution
13	49	F	154	Dengue with Hepatic Encephalopathy	No	Irritability, Confusion, Sleep disturbances	Yes	Haloperidol Promethazine	Yes,3days
14	79	F	148	Diabetes Mellitus, Hypertension	Alzheimer's Dementia	Irritability, Anger outburst, Confusion Sleep disturbances	No	Donepezil Quetiapine Clonazepam	Yes,symptoms controlled in 10 Days
15	20	F	147	No	Brief	Irritability,	No	Olanzapine	Yes,10 days

					Psychotic Disorder	Suspiciousness, Fearfulness Sleep Disturbances, Anger Outbursts			
16	40	F	148	No	Schizophrenia	Irritability, Suspiciousness, Fearfulness Sleep Disturbances, Anger Outbursts	No	Olanzapine	Yes, 10 days
17	79	F	147	No	Dementia	Irritability Anger Outbursts, Forgetfulness, Sleep Disturbances	no	Quetiapine	Yes, Symptoms controlled in 10 days
18	68	F	148	DKA with Diabetes mellitus, Hypertension, Hypothyroidism	No	Irritability Sadness of mood, Sleep disturbances	No	Haloperidol Promethazine Escitalopram	Yes, 7Days
19	58	M	149	CJD	No	Irritability, Anger outburst, Confusion Sleep disturbances	Yes	Donepezil	Yes, 5 days
20	73	F	163	No	No	Irritability Confusion Sleep disturbances	No	None	No Resolution

OUTCOME

Out of the 20 patients, only 18 showed resolution in symptoms (90%) and majority of the patients received only psychotropic medications for behavioural control which helped in symptom resolution in 5-10 days

approximately. Fastest symptom resolution (3-5 days) was seen in those given Sodium correction with (22%) or without psychotropic medication (6%).

This has been summarized in figure 1 and figure 2.

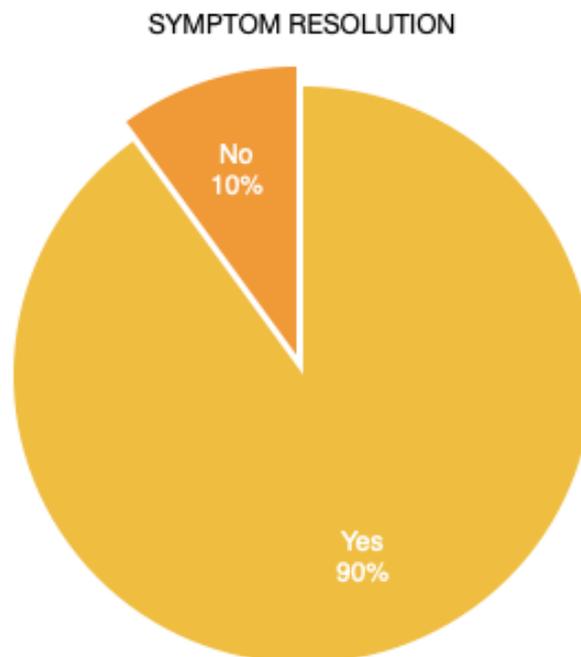


Figure 1: Distribution of patients with resolution of symptoms.

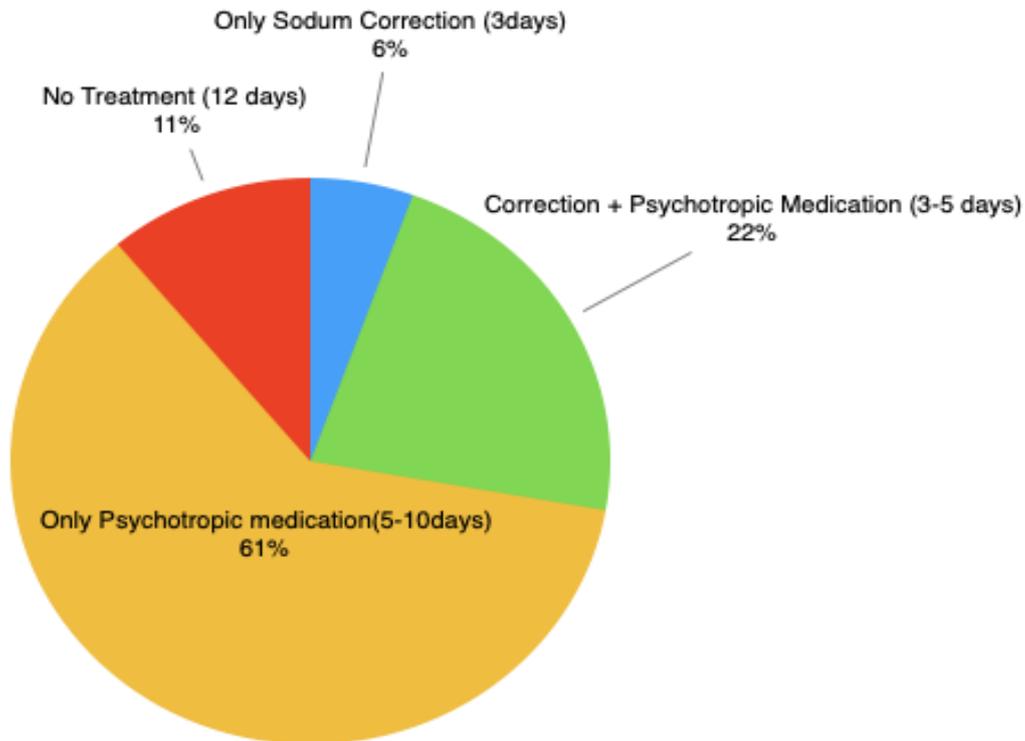


Figure 2: The approximate time taken for resolution of Symptoms with/without different modalities of treatment.

In this case series, it was observed that most of the acute behavioural disturbances in the patient could be attributed to the increased serum sodium and resolution of symptoms in these patients was faster following correction of the increased serum sodium with or without the use of psychotropic medications for behavioural control.

There was initial resolution in the severity of the symptoms irrespective of the underlying etiology i.e. medical or psychiatric comorbidity suggesting the need for timely detection and the crucial role of sodium correction in these patients.

Often neuropsychiatric manifestations are a common phenomenon with hyponatremia and are a rare presentation in those with hypernatremia as compared to the other clinical signs and symptoms. Serum sodium levels greater than 160mEq/L may show some neuropsychiatric symptoms as seen in some studies, but in this case series it was observed that even a slight elevation in the serum sodium levels could precipitate behavioural disturbances and psychiatric symptoms mainly Irritability, sleep disturbances, confusion, and disorientation.^[8]

Hypernatremia is often prevalent in elderly patients with multiple medical or psychiatric illnesses, making it harder for the physician to detect and differentiate it from the clinical manifestations of the primary illness.^[8]

Untreated hypernatremia can give rise to a hyperosmolar state which can result in shrinkage and damage of the neuronal tissue. This in turn can lead to life threatening complications like intracerebral or subarachnoid hemorrhage.^[8] Hence it has been recommended that early detection of electrolyte disturbances should be done if acute behavioural disturbances persist and in case of increased serum sodium monitoring every 2-4 hours if patient is admitted in the intensive care unit should be done along with correction of serum sodium by not more than 10-12mEq/L in 24 hours.^[1] Rapid correction of serum sodium can lead to complications like cerebral edema, seizures and permanent damage to the neural tissues, hence should be avoided and preferably done in a graded manner.

Studies have shown the development of an acute organic brain syndrome, due to hypernatremia which is like some of the clinical presentations of the patients in this case series but is suggested to be rare compared to its classical array of symptoms. This can be associated with acute mild to moderate cognitive impairment which may resolve following sodium correction and psychotropic management for any accompanied behavioural disturbances.^[8,9]

Elderly patients with underlying physical and neurological impairments and illnesses are more likely to have recurrent episodes of hypernatremia hence due precaution must be taken to avoid the same. Patients on chronic psychotropic or other medications causing

electrolyte imbalances must be monitored periodically to avoid readmission due to hypernatremia.

CONCLUSION

Electrolyte imbalance accounts for majority of the acute behavioural disturbances observed in hospitalized patients but remains undetected or masked as clinical signs of other chronic medical or psychiatric illnesses.

In this case series we observed that hypernatremia can initially present as acute behavioural disturbances or disturbances in the sleep wake cycle but can often be mistaken to be manifestations or exacerbations of the underlying medical or psychiatric illness or misdiagnosed as a psychiatric illness.

Awareness that electrolyte imbalances, especially hypernatremia can be a contributing factor to development of any acute behavioural or mood symptoms could help physicians in early detection, intervention, and improvement in the general as well as mental condition of the patient.

Psychotropic medications alone cannot hasten the resolution of symptoms and the role of sodium correction with regular monitoring of the serum sodium levels leading to rapid improvement has been highlighted in this case series.

Increased serum sodium levels if not detected in a timely fashion could lead to hemorrhage, lethargy, stupor or in dire circumstances, even coma. These complications can be prevented by early vigilance to the signs of hypernatremia, especially any acute behavioural changes, periodic monitoring of elderly patients with long term neurological or psychiatric illnesses and those on medications for chronic medical and psychiatric illnesses. Readmission and recurrence of hypernatremia can be avoided by timely inpatient as well regular outpatient care.

ABBREVIATIONS

COPD- Chronic obstructive pulmonary disease

RHD- Rheumatic Heart disease

AS- Aortic Stenosis

DKA- Diabetic Ketoacidosis

CJD- Creutzfeldt-Jakob disease

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