



ORIGINAL RESEARCH PAPER

General Medicine

ETIOLOGY OF HYPONATREMIA IN GERIATRIC AGE GROUP PRESENTING WITH ALTERED SENSORIUM IN WESTERN RAJASTHAN.

KEY WORDS: Hyponatremia, Cause, Hormone.

Dr. Vivek Lakhawat

Senior Resident, General Medicine, Dr. Sampurnanand Medical College, Jodhpur

Dr. Anil Sankhla*

Assistant Professor, General Medicine, Dr. Sampurnanand Medical College, Jodhpur. *Corresponding Author

Dr. Arvind K. Jain

Senior Professor, General Medicine, Dr. Sampurnanand Medical College, Jodhpur.

ABSTRACT

INTRODUCTION – Hyponatremia is most common electrolyte imbalance in geriatric patients. Determining etiologies of such patients would help in identifying candidates for future prevention.

METHOD AND MATERIAL – We had studied 50 patients of hyponatremia with altered sensorium in geriatric age group. These patients were evaluated for the underlying cause of hyponatremia and hormones involved in hyponatremia.

RESULTS – Most common cause was CVA (32%), followed by CHF (30%), diuretics (28%), renal failure (26%), hypothyroidism (10%), pneumonia (10%), adrenal insufficiency (10%), liver disease (8%) and ICSOL (2%). Among hormones, vasopressin was raised in 96% patients, glucocorticoid and mineralocorticoid was diminished in 10% patients and aldosterone was diminished in 6% patients.

DISCUSSION – Hyponatremia is a common problem in hospital more so in critically ill ICU patients. The possible cause of hyponatremia should always be sought as an outcome in severe hyponatremia is governed by etiology and not by serum level of sodium.

INTRODUCTION

Hyponatremia is most common electrolyte disorder in hospitalized patients particularly in elderly. It is important to recognize Hyponatremia because of the potential morbidity and the economic impact on the patient and the health care. Studying the etiology, risk factors and hormonal response of hyponatremia in hospitalized patient will help in reducing its incidence, management and minimize the complications associated with hyponatremia.

Hyponatremia in geriatric age in due to impairment of free water excretion as renal plasma flow and glomerular filtration rate decreases in old age group. [1,2]. Lower solute mediated excretion in old age due to decreased intake of solute and decrease urea secondary to decrease protein intake and reduction in muscle mass. [3,4,5] In old age osmoreceptors mediated suppression of vasopressin release is slowed, thus increased propensity to develop hyponatremia [6].

This study explored how disturbances in water homeostasis causes hyponatremia in elderly and try to evaluate etiologies of hyponatremia.

METHODS AND MATERIAL

50 patients of hyponatremia with altered sensorium in geriatric age group were studied prospectively from Oct 2017 to Dec 2017. Serum Sodium level less than 135 meq/l with altered sensorium and age >60 years were set up as cut off values.

Detailed history was taken including symptom of hyponatremia such as altered sensorium, postural dizziness, lethargy and seizures. Drugs that can increase the non osmotic release of antidiuretic hormone (ADH) or potentiate its renal action (ADH-stimulating drugs) were recorded. History of illnesses causing hyponatremia such as congestive heart failure, chronic kidney disease, chronic liver disease, hypothyroidism and other condition which are associated with SIADH such as small cell lung carcinoma, CNS disease, pulmonary disease were taken and recorded. History of fluid loss such as in vomiting, diarrhoea, diuretic use, excessive sweating was taken in all patients.

On examination signs of hypovolemia were noted including tachycardia, orthostatic fall in blood pressure, decreased skin turgor, dry mucous membranes and decrease peripheral perfusion with a delayed capillary refill more than three seconds. Hypervolemic states such as ascites, pitting pedal edema and raised Jugular venous pressure (JVP) were noted. Accordingly patients were divided into hypervolemic, hypovolemic and euvolemic states.

Following investigations were done CBC, ABG and serum electrolytes, urinary sodium, RFT and LFT, ECG and 2d-ECHO, chest X-ray, USG- abdomen and pelvis, TSH, serum cortisol, serum aldosterone, serum vasopressin (ADH) and CT scan head or MRI Brain. Serum osmolarity was calculated by the following formula:-

$$\text{Serum osmolarity} = 2([\text{Na}^+] + [\text{K}^+]) + \text{RBS}/18 + \text{BUN}/2.8 \text{ mOsm/L}$$

Patients were divided in following groups depending on their serum osmolarity:-

- i. Normal osmolarity = 270-290 mOsm/L
- ii. Hyper osmolarity = >290 mOsm/L
- iii. Hypo osmolarity = <270 mOsm/L

Patients with hyponatremia were classified according to the joint European guidelines [7] as follows:-

- 1. Mild = 130-134 mOsm/L
- 2. Moderate = 125- 129 mOsm/L
- 3. Severe = < 125 mOsm/L

Data were recorded on a predesigned performa and was systematically analyzed.

RESULTS

In age distribution maximum number of patients were between 60-69 years, which was 60% (n=30) of the total study population. 30% (n=15) patients were in age group of 70-79 years, 8% (n=4) patients were of age group of 80-89 years and only 2% (n=1) was more than 90 years old.

In sex distribution, maximum were male accounting 68% (n=34) and rest 32% (n=16) were female.

Table 1 - Age wise and sex wise distribution of patients

		No. of patients	Percentage
Age wise distribution	60-69 years	30	60%
	70-79 years	15	30%
	80-89 years	4	8%
	>= 90 years	1	2%
Sex wise distribution	Male	34	68%
	Female	16	32%

Among pre-existing comorbid illness most common condition was hypertension present in 34% (n=17). Second most common pre existing illness was diabetes in 28% (n=14). Renal disease was found in 10% (n=5), cerebrovascular accidents in 6% (n=3), hypothyroid in 6% (n=3) and liver disease in 2% (n=1). 32 patients were admitted without any comorbid condition.

According to hydration status 50% (n=25) patients were hypervolemic, 42% (n=21) patients were euvolemic, while only 8% patients were hypovolemic.

As per joint European guidelines 46% (n=23) were having moderate hyponatremia (125-129 mmol/L) 28%, (n=14) were having severe hyponatremia (<125 mmol/L) and 26% (n=13) were having mild hyponatremia (130-134 mmol/L)

Based on etiologies, out of 50 patients, 25 (50%) patients had multiple etiological factors & in 5 (10%) patients cause remained idiopathic. Among single etiological factor CVA was found in 12% (n=6) patients in this study population. Pneumonia accounts for 8% (n=4) patients. CHF was found in 6% (n=3) patient, hypothyroid in 6% (n=3) patients, renal disease in 2% (n=1) patients, liver disease in 2% (n=1) patients and ICSOL in 2% (n=1) patients.

Most common etiology of hyponatremia with altered sensorium in our study was CVA found in 32% (n=16) followed by CHF found in 30% (n=15) patients. Diuretics use in 28% (n=14), renal failure in 26% (n=13), hypothyroidism in 10% (n=5), pneumonia in 10% (n=5), adrenal insufficiency in 10% (n=5), liver disease in 8% (n=4) and ICSOL in 2% (n=1) were other common causes in this study population.

Table 2 - Most common etiologies of hyponatremia with altered sensorium

Etiology	No. of patients	Percentage
CVA	16	32%
CHF	15	30%
Diuretic	14	28%
Renal disease	13	26%
Hypothyroidism	5	10%
Pneumonia	5	10%
Adrenal insufficiency	5	10%
Liver disease	4	8%
ICSOL	1	2%

In this study population hyponatremia with altered sensorium due to hypothyroidism was uncommon. Out of 50 patients only 5(10%) patients had hypothyroid state.

Only glucocorticoid deficiency was found in 2 (4%) patients, only mineralocorticoid deficiency was found in 2(4%) patients and insufficiency of both was found in 1 (2%) patient.

96% (n=48) patients with hyponatremia had elevated vasopressin (ADH) level and 78 % (n=39) patients with hyponatremia had elevated urine sodium concentration. Aldosterone level was diminished in 6% patients.

DISCUSSION

Most common age group presented with hyponatremia was 60-69 year. Out of 50 patients, 60% patients were from this age group. As this study included patients of geriatric age group

only, so risk of hyponatremia with age could not be calculated.

Yawar et al found that 220 patients were admitted with hyponatremia. Out of those 127 patients (57.7%) were female and 93 (42.3%) were males [8]. In our study prevalence of hyponatremia was more common in males accounting 68%, while only 32% females presented with altered sensorium with hyponatremia. This difference could be due to the fact that patients admitted in male medical ward outnumbered patients admitted in female medical ward.

In our study, most of the patient had comorbid conditions, like hypertension, DM, IHD, CVA, CKD etc. Hypertension (34%) and diabetes (28%) were the most common comorbid condition in our study, which was similar to study by Mohan and Parikh et al. [9]

In study by Bennai et al hypovolemic hyponatremia was observed in 77(23.7%), hypervolemic in 71 (23.7%) and normovolemic in 152 (50.6%) patients [10]. In our study, most of the patients were hypervolemic which accounted 50% (n=25) of the total study population. 42% (n=21) patients were euvolemic and 8% (n=4) patients were hypovolemic which was contradictory with the study by Bennai et al. This may be due to the reason that their study was focused on SIADH etiology and was done on large population group.

In study of hyponatremia by Sundaram and Mankikar et al 31 patient (4.5%) had severe hyponatremia (<125 mmol/L), 77 patients (11.3%) had moderate hyponatremia (126-130 mmol/L) and 572 patients (84.2%) had mild hyponatremia (>130mmol/L) [11]. On comparing with our study we found that 46% (n=23) patients had moderate hyponatremia, 28% (n=14) patient had severe hyponatremia and 26% (n=13) had mild hyponatremia. Difference in outcome could be due to inclusion of only hyponatremia with altered sensorium in our study.

Clayton et al found that hypothyroidism induced hyponatremia occurred in 3.7% [12]. In our study hyponatremia due to hypothyroidism was found in 5 (10%) patients.

Yawar et al found that out of 220 patients, drugs induced hyponatremia was most common cause found in 30% (n=66) cases. Other causes were gastrointestinal in 25% (n=55), chest infection in 11% (n=24) patients, depletion hyponatremia in 10% (n=22) patients, SIADH in 6% (n=13) patients, etc. [8] In our study most common cause CVA was found in 32% (n=16) patients. Among other CHF was present in 30% (n=15) patients, diuretics in 28% (n=14) patients, renal failure in 26% (n=13) patients, hypothyroidism in 10% (n=5) patients, etc. These results did not match with results of Yawar et al.

In study by Clayton et al on hyponatremia most common etiology was multifactorial (75%). 25 out of 105 patients had single etiology which includes thiazides/diuretics in 11 patients, liver disease in 4 patients, CVA in 2 patients, hypopituitarism in 2 patients, lower respiratory tract infection in 1 patient, carbamazepine in 1 patient and unknown cause in another 4 patients. [12]. In our study most common etiology of hyponatremia was multifactorial i.e. 25 (50%) patients. Among single etiological factor CVA was found in 12% (n=6) patients, pneumonia in 8% (n=4) patients, hypothyroidism in 6% (n=3) patients, CHF in 6% (n=3) patients, renal disease in 2% (n=1) patients and ICSOL in 2% (n=1) patients. These results showed less similarity with Clayton et al study.

In study by Vitting and Gardenwartz et al vasopressin levels were elevated in 93.75% patients [13]. In our study serum vasopressin level was raised in 96% patient which was similar to study by Vitting and Gardenwartz et al.

In study by Hannon MJ et al cause of hyponatremia by bioch

emical hormone measurement showed glucocorticoid insufficiency in 4/49 (8.2%) patients [14]. Similar to this study our study showed glucocorticoid deficiency in 6% (n=3) patients.

We did not found any study co-relating hyponatremia with aldosterone insufficiency, but in our study 6% (n=3) patients showed hyponatremia with aldosterone insufficiency.

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