Clinico-Etiological Profile of Electrolyte Imbalance among Patients in a Government Hospital in Dakshina Kannada

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ABSTRACT

Introduction: Hyponatremia is a state of electrolyte imbalance with a high prevalence rate, it is one of the leading cause of morbidity and mortality in our settings. The aim of this study was to evaluate the clinical features and etiology of hyponatremia in patients admitted in our government hospital.

Material and methods: A 1-year prospective cross-sectional observational study was conducted on adult patients with moderate-to-severe hyponatremia admitted to the hospital. Patients demographics were recorded and investigations were documented. Data were analyzed using independent sample t-test.

Results: Vomiting (28) followed by confusion (26) was the most common complaint. Confusion was significantly high in patients with severe hyponatremia as compared to patients with moderate. Increased urine sodium levels were observed in these patients

Conclusion: Patients with hyponatremia secondary to an infectious cause should be meticulously screened and timely and effective treatment of hyponatremia is determined by the effective understanding of pathophysiology and associated risk factors of hyponatremia.

Keywords: Hyponatremia, Moderate and Severe Hyponatremia, Serum Sodium.

INTRODUCTION

Hyponatremia, or low blood sodium, is frequently defined as serum sodium concentration < 135 mEq/L, and it represents a relative excess of total body water to sodium.[1,2]

The clinical presentation has a wide spectrum and varies from patient to patient, from being asymptomatic, to ones having seizures and coma. Most of the patients with hyponatremia have either non-specific symptoms or symptoms due to underlying system involved.

Although majority of cases are mild and asymptomatic, hyponatremia is important clinically because 1) Acute severe hyponatremia can cause substantial morbidity and mortality. 2) Mortality is higher in patients with hyponatremia who have a wide range of underlying diseases.[3]

Despite the knowledge of hyponatremia since half a century, this common disorder remains a mystery in many basic areas because of its association with a large variety of underlying disease states, and its multiple aetiologies with different pathophysiological mechanisms.

There is a lack of data on clinical spectrum of hyponatremia in our tertiary care centre; therefore, we planned to undertake a study to understand profile of patients with hyponatremia admitted in hospitals under Kasturba Medical College, Mangalore.

MATERIAL AND METHODS

All the patients admitted with hyponatremia to hospitals under Kasturba Medical College, Mangalore, between October 2012 and April 2014 were included in the study. Written informed consent was obtained from the patient/guardian prior to their inclusion in the study.

Inclusion criteria: All patients admitted with serum Sodium <135 mEq/L.

Exclusion criteria
1. Post operative patients.
2. Patients under the age of 18yrs.

Study instrument and data collection
Study was conducted in the government hospital attached to Kasturba Medical College. A hundred patients, those admitted patients with serum sodium <135 mEq/L were evaluated. A detailed history to extract baseline socio demographic characteristics like age, sex, date of admission etc. presenting symptoms, any preexisting medical illness, treatment history (especially drugs which can cause hyponatremia), was taken. A thorough examination to assess the volume status of the patient and the relevant system involved was done, following which, a set of biochemical investigations were sent. All the data was entered in a self structured proforma. Data was fed into Statistical Package for Social Sciences (SPSS) version 11.5 and analysis was done.

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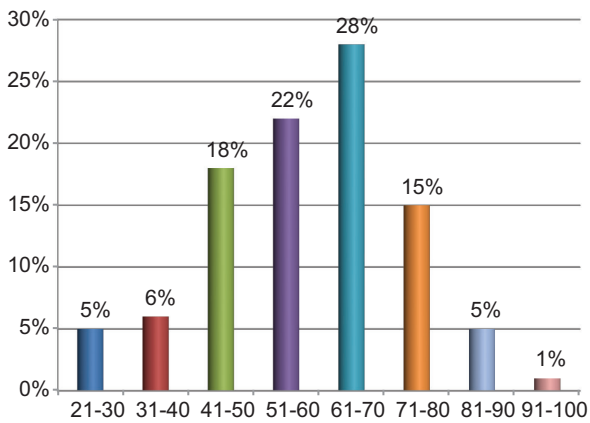
Figure-1: Age Distribution

RESULTS

A total of 100 patients were studied who were admitted with hyponatremia to hospitals under Kasturba Medical College, Mangalore between October 2014 and April 2016.

Age distribution: The maximum numbers of patients were in the age group of 61-70(28%). Youngest patient was 23 yrs old while the oldest patient was 91 yrs. Mean age was 58.8. The numbers of patients in each age group are shown in figure 1.

Sex distribution: There were 61 males and 39 females out of total 100 patients in this study.

Symptoms (pertaining to hyponatremia): Out of the 100 patients studied, 30 patients were asymptomatic at presentation.

Correlation of symptom and level of hyponatremia: The total of 30% was asymptomatic with documented hyponatremia. The lowest serum sodium amongst asymptomatic patients was 109.

Among those who were symptomatic (symptoms pertaining to hyponatremia) most of them had a combination of symptoms. About 40% had lethargy, 19% had disorientation, 19% had vomiting, 12% had anorexia, 5% patients had seizure, 2% patients had coma, 1% patients had hiccups.

DISCUSSION

Our study was conducted on 100 patients who presented with hyponatremia (serum sodium less than 135 mEq/L). Out of the 100 patients studied there were 61% males and 39% females with a ratio of 1.56:1.

The mean age of presentation in our study was 58.8, which was comparable to study by Anderson et al where the mean age was 58.[4] Incidence of hyponatremia has been shown to have direct correlation with age.[5] In our study most of the patients were in the age group of 41-80yrs (83%), while maximum number of patients were in the age group of 61-70 yrs (28%). Multiple co morbidities like Hypertension and Diabetes Mellitus are present in this age group where the disease or treatment is likely to predispose a patient to hyponatremia. Use of diuretics is also common among the elderly patients, which has been a major cause

of hyponatremia in hospitalized patients. Hawkins et al noted that increasing age, was independently associated with hyponatremia at presentation.[5] A study done by Chen et al on elderly patients also showed that nutritional status is also a risk factor in developing hyponatremia in elderly.[6]

In our study 70% of the patients had symptoms attributable to hyponatremia at presentation. The rest of the patients (30%) did not have evident clinical manifestations of hyponatremia, but presented with the symptoms of the system involved. Respiratory system was the commonest system involved (23%). Other systems involved were gastrointestinal (14%), renal (9%) and neurological (13%).

The commonest symptom of presentation was lethargy (40%) followed by vomiting (19%). Amongst the other symptoms at presentation were neurological symptoms like disorientation (19%), seizure (5%) and coma (2%). Lethargy was also the commonest symptom in patients with severe hyponatremia (sodium <120 mEq/L) followed by disorientation (11 patients).

All the patients were classified as hypovolemic, euvolemic or hypervolemic depending on the volume status which was determined by clinical evaluation. It was found that 61% of the patients were euvolemic, 25% were hypovolemic and 14% were hypervolemic. This was similar to the other studies, Hochman[7] (50%) and Nandini et al[8] (50.74%), which showed maximum percentage of euvolmic patients.

A common cause of hyponatremia in patients with cancer is syndrome of inappropriate secretion of antidiuretic hormone (SIADH) which may result from ectopic production of argentine vasopressin (AVP) by tumor tissue. In our study 13 out of 44 patients with SIADH had cancer, commonly head and neck. Other risk factors which increased the possibility of hyponatremia were chemotherapy, vomiting, pain, narcotic drugs and physical and emotional stress.

Twelve percent of the patients in our study had multiple etiologies. Previously it has been seen that in varying proportion of patients hyponatremia has been attributed to a multiple etiologies. A couple of studies by Clayton et al[10] and Nzerue et al[9] had 75% and 10.9% patients with hyponatremia due to multiple etiologies. It is important to determine all the factors causing hyponatremia as the treatment depends on the etiology and thus correct measures could be taken accordingly.

Mean value of sodium in our study was 122.23 mEq/L (100 mEq/L – 134 mEq/L). This was a little lower than mean obtained by study done by Nandini et al.[8]

Plasma glucose level was calculated in 86 patients with range varying from 73-522 mg/dl. It was this high glucose values which was responsible for the presence of pseudohyponatremia in our study. Similar observation holds true for serum triglycerides (range 20-276 mg/dl).

Evaluation of serum osmolality was done in all 100 patients and mean value was determined to be 264.68 mOsmol/kg water which goes well with our observation that most of the cases studied were true hyponatremias (serum osmolality < 280 mOsmol/kg serum water).

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CONCLUSION

Hyponatremia is a common electrolyte abnormality found in medical wards.

Elderly people are more prone to develop hyponatremia. Although 30% patients did not manifest with any symptoms pertaining to hyponatremia, amongst the symptomatic patients, the commonest symptom for hyponatremia in our study was lethargy. Major preexisting illnesses were hypertension, diabetes and retroviral disease. Hyponatremia can be diagnosed with a relevant history of presenting illness and medications use along with a thorough clinical examination for assessment of volume status. This is followed by a appropriate biochemical investigations to confirm the aetiology. It is important to diagnose the cause of hyponatremia as institution of appropriate management solely depends on the same.

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