A Study on Incidence and Etiology of Hyponatremia in Hospitalised Elderly Patients Admitted in RIMS

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Abstract

**Background:** Hyponatremia is one of the commonest electrolyte abnormality in clinical practice and most common cause for hospital admission among elderly patients. Causing significant mortality and morbidity. Early detection and treatment may significantly decrease mortality.

**Aim:** To know the incidence and etiology of hyponatremia

**Materials and Methods:** This was prospective observational study done between October 2011 to October 2012 at Rajendra Institute of Medical Sciences, Dept of General Medicine, Ranchi. All patients with more than 60 yrs of age with atleast two serum values less than 130 mmol/L were included.

**Results:** Total no of patients admitted was 2100 and serum Sodium done for 2000 patients. Incidence of hyponatremia was 18.9% and severe hyponatremia was 5%. Most common age group affected with hyponatremia was 61-70 yrs (44%). Most common symptom was nausea, vomiting, seizure and altered sensorium. Most common etiology for hyponatremia was SIADH (28%) and Diuretics was second commonest cause (15%).

**Conclusion:** Symptomatic hyponatremia was more common among hospitalised elderly patients, SIADH and Diuretics was most common cause for hyponatremia. Mortality was about 10%, was mainly due to underlying primary disease. Most of symptoms of hyponatremia were relievd following treatment.

**Keywords:** Hyponatremia, SIADH, Diuretics, Vomiting, Seizures.

Introduction

Disorders of serum Na+ concentration are caused by abnormalities in water homeostasis, leading to changes in the relative ratio of Na+ to body water. Water intake and circulating AVP constitute the two key effectors in the defense of serum osmolality; defects in one or both of these two defense mechanisms cause most cases of hyponatremia and hypernatremia. Hyponatremia, which is defined as a plasma Na+ concentration <135 mM, is a very common disorder, occurring in up to 22% of hospitalized patients. This disorder is almost always the result of an increase in circulating AVP and/or increased renal sensitivity to AVP, combined with an intake of free water; a notable exception is hyponatremia
due to low solute intake. The underlying pathophysiology for the exaggerated or “inappropriate” AVP response differs in patients with hyponatremia as a function of their ECFV. Hyponatremia is thus subdivided diagnostically into three groups, depending on clinical history and volume status, i.e., “hypovolemic,” “euvolemic,” and “hypervolemic”

Hyponatremia is one of the common electrolyte disorder, contributing emergency hospital admission, causing significant mortality and morbidity. Incidence of Hyponatremia in hospitalised patients range from 15-30%, it can reach up to 40-50% in elderly patients.

High incidence of Hyponatremia in elderly patients due to multiple factors, intake of multiple drugs like diuretics, Psychiatric drugs like SSRI, comorbid condition like IHD, Renal disease and impaired thirst mechanism and problem in age related cognition.

Symptoms of Hyponatremia depends upon onset and severity. Usually chronic Hyponatremia are asymptomatic. Acute and severe Hyponatremia mostly symptomatic.

Common symptoms of hyponatremia include nausea, vomiting, giddiness, seizure episodes and sometimes come and death.

On the basis of osmolarity Hyponatremia can be classified into Hypertonic, Isotonic and Hypotonic Hyponatremia respectively.

Hypotonic Hyponatremia further classified in to hypovolumic, Euvolumic, Hepervolumic Hyponatremia respectively. Euvolemic Hyponatremia was most common type of Hyponatremia in elderly patients. Most common etiology for Euvolemic Hyponatremia was SIADH.

Aims and Objectives
To know the incidence and etiological cause for hyponatremia.

Materials and Methods
This was prospective cross sectional observational study conducted over a period of one year from October 2011 to October 2012 at RIMS Ranchi.

Inclusion criteria
All patients >60 years with atleast two Serum sodium values <130 Mmol/L

Exclusion criteria
Patients with age <60 years
Patients with Pseudohyponatremia

The lab values of serum Sodium of all patients from October 2011 to October 2012 was studied from which incidence of Hyponatremia was calculated. Out of this Hyponatremic patients, a sample size of 100 patients were randomly selected by simple random sampling. In the hospital all the patients admitted to wards and Micu during that period, as routine blood samples were taken and serum electrolytes were done in central biochemistry laboratory. The records were followed up for patients with hyponatremia and values repeated once for confirmation.

A standard proforma was used to record detailed history and clinical examination findings. The probable cause was diagnosed and outcome of hospitalization was recorded.

All the date entered to SPSS 22 version. Hyponatremia incidence in the hospitalized elderly patients was calculated. The relationships between hyponatremia severity and age groups, sex, duration of hospital stay and outcome were studied using the chi-square, independent student’s T test and Mann Whitney U tests. The results were evaluated by hazard ratio and 95% confidence interval. In these analyses, p values <0.05 were considered statistically significant.

Results
The total number of patients admitted to Medicine dept was 2100 and serum Sodium was done for 2000 patients. The number of patients with serum Sodium less than 130 mmol/l was about 378 patients. Incidence of Hyponatremia was 18.9%.
Incidence of Severe Hyponatremia was 5%. Incidence of Hyponatremia in MICU was 36%.
Most common age group affected was 61-70 years (54%), followed by 71-80 years (30%). Total number of male patients were 57 (57%) and female patients were 43 (43%).
Common chronic disease associated with hyponatremia patients was HTN (58%), DM (50%), Cardiac disease (31%), Respiratory disease (16%) and CKD (10%).
Out of 100 patients 62 (62%) were euovolemic, 19 (19%) were hypervolemic, 19 (19%) were hypovolemic. The mean initial serum Sodium was 118 mmol/l
Most common cause for Hyponatremia was SIADH (28%), Diuretics (15%), Dehydration (12%). Out of 100 patients 90 patients improved (90%), 2 patients gone DAMA and 8 (8%) patients died.

Discussion
Incidence of hyponatremiaia common in elderly patients and it can cause significant mortality if not treated early. Incidence of hyponatremia in our study was 18.9%. Incidence of severe hyponatremia was 5% and incidence of hyponatremia in MICU patients was 36%, may be because of comorbid other conditions like cardiac and renal disease. Study done by Nuket Bayram Kayar et al showed incidence of hyponatremia was 18%. Study done by Waikar et al showed 14.5% incidence. (Table-1). Study done by Sandar Win et al showed incidence severe hyponatremia was 4.8%.

Table 1 Comparison of incidence with different studies

| Studies                  | Incidence (%) |
|--------------------------|---------------|
| Present study            | 18.9%         |
| Nuket Bayram Kayar et al | 18%           |
| Waikar et al             | 14.5%         |
| Gosch et al              | 16.7%         |

Most common age group was 61-65 (31%) and 56% were males and 44% were females. In our study mean age was 68.62 years. Most common symptoms in our study was nausea and vomiting (67%). (Table-2)

Table 2 Comparison of clinical profile with different studies

| Clinical profile | Present study | Sonikumar et al |
|------------------|---------------|-----------------|
| 61-65 years      | 30%           | 31%             |
| 66-70 years      | 26%           | 22%             |
| Males            | 57%           | 56%             |
| Females          | 43%           | 44%             |
| Mean age         | 68.62 years   | 71.26 years     |
| Symptoms         | Nausea, vomiting | Nausea, vomiting |

In our study most patients had chronic disease like Diabetes mellitus (50%), Hypertension (58%), Cardiac disease (31%) and Respiratory disease. This may be reason for Higher incidence of hyponatremia in elderly patients. (Table-3)

Table 3 Comparison of frequency of pre existing disease with other studies

| Pre existing disease | Present study (%) | Shanmugasundara mRajamani et al (%) |
|----------------------|-------------------|------------------------------------|
| DM                   | 50%               | 63%                                |
| HTN                  | 58%               | 44%                                |
| CHD                  | 31%               | 24%                                |
| CKD                  | 10%               | 9%                                 |
| COPD                 | 16%               | 19%                                |

In our study 29% patients taking diuretics for other pre existing disease loke HTN and CHD. This was the common reason for hyponatremia in elderly patients. In our study 29% were mild hyponatremic, 56% were moderate hyponatremic and 5% were severe hyponatremic. All the patients with severe hyponatremia were symptomatic. As the severity of hyponatremia increases it causes more symptoms. (Table-4)

According to hydration status, 62% patients were Euovolemic, 19% were Hypervolemic and 19% were Hypovolemic. Most common etiology was SIADH, followed by drugs like Diuretics. Mortality was about 8%. (Table-5)
Table 4 Comparison of Hypotonic hyponatremia with other studies

| Volume status | Present study(%) | Shanmugasundaram Rajamani(%) |
|---------------|------------------|------------------------------|
| Euvolumic     | 62%              | 59.5%                        |
| Hypervolumic  | 19%              | 23.4%                        |
| Hypovolumic   | 19%              | 17%                          |

Table 5 Comparison of etiologies with other studies

| Etiology       | Present study (%) | Shanmugasundaram Rajamani(%) |
|----------------|-------------------|------------------------------|
| SIADH          | 28%               | 20.6%                        |
| Drugs          | 15%               | 48.2%                        |
| Renal disease  | 12%               | 13.4%                        |
| Cardiac disease| 6%                | 13.4%                        |
| Liver disease  | 2%                | 1.7%                         |
| Dehdration     | 12%               | 3%                           |

Conclusion
Electrolyte abnormality was common in elderly patients, specialty Hyponatremia was the commonest electrolyte abnormality among hospitalised elderly patients admitted to medical wards. It is important to diagnose early to prevent mortality, morbidity, prolonged hospital stay and economic burden to the family and nation. Most of the patients had pre existing disease like DM, HTN, CKD. These patients were taking thiazide and other anti hypertensive drugs. This may be most important cause for hyponatremia in elderly patients and it is very important to advice regular electrolyte estimation and to explain about common symptoms of hyponatremia to the patients, so that they can consult doctor early.

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