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ORIGINAL ARTICLE

Frequency of Hyponatremia in Tuberculous Meningitis Patients

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ABSTRACT

Back Ground: A severe inflammation of the meninges is often referred to as meningitis. Hyponatremia has been associated with tuberculous meningitis in numerous studies.

Objective: To assess the frequency of hyponatremia in tuberculous meningitis patients

Methodology: This cross sectional study was carried out at the department of Neurology Bolan Medical Complex Hospital, Fatima Jinnah Institute of Chest Diseases and Sheikh Khalifa Bin Zayyed Al Nahyan Medical Complex Quetta for duration of one year from September 2021 to September 2022. All the required data like name, gender and presence or absence of hyponatremia were documented in a special proforma designed for this research. Data analysis was carried out by using SPSS version 23.

Results: In our study, totally 210 patients were included. The male participants in our study were 94 (44.76%) while female participants were 116 (55.24%). The mean sodium level in serum was observed to be 133 with SD of ± 4.29. The overall frequency of hyponatremia in tuberculous meningitis patients was 113 (53.81%).

Conclusion: Our study concludes that the frequency of hyponatremia in tuberculous meningitis patients was very high (53.81%). Hyponatremia may have serious implications, including serious neurological problems and death, if it is not properly diagnosed and treated early

Keywords: Frequency, hyponatremia, tuberculous meningitis

INTRODUCTION

A severe inflammation of the meninges is often referred to as meningitis. Infectious meningitis is classified into three types based on the type of microorganism as bacterial, viral and fungal meningitis [1]. It is unclear how often meningitis occurs, despite the fact that it is a reportable condition in many nations. It is projected that 420,000 fatalities occurred as of 2010 [2]. A serious variation of extra-pulmonary tuberculosis is tuberculous meningitis. It is to be anticipated that the incidence rate will be correspondingly high in nations that have a higher incidence of pulmonary tuberculosis [3]. Numerous immediate and long-term problems are connected to meningitis. Hyponatremia, which is characterized as a blood sodium content of less < 135 mEq/L, is one of the acute consequences [4]. In patients being treated in hospitals, it is the most typical electrolyte imbalance. Osmotic demyelination syndrome is one of the neurological problems that may result from improper care of hyponatremia. ADH plays a major part in the pathophysiology of hyponatremia since the majority of instances of hyponatremia are caused by imbalance in water and improper water handling rather than imbalance of sodium. Hyponatremia may cause symptoms including nausea, vomiting, confusion, headache, lethargy, weariness, lack of appetite, irritability, restlessness, cramps or spasms, seizures, and diminished awareness or coma [5]. Due to the fact that all of these symptoms may also appear in meningitis by themselves, it is challenging from a medical perspective to ascribe these symptoms to hyponatremia. For this reason, it is crucial to serially examine the serum electrolytes to exclude hyponatremia since it might result in edema and hyponatremic encephalopathy. Tentorial herniation may result from this. The goal of the present investigation is to ascertain the prevalence of hyponatremia in tuberculous meningitis in the local adult community since the majority of investigations have been conducted in children. The objective of the research is to draw attention to the problem since hyponatremia is one of the factors that might contribute to the worsening of this medical problem. This research will assist us in gathering regional data that measure the scope of the issue. The findings of this research will be helpful in planning how to treat patients with electrolyte abnormalities in general and hyponatremia in particular, with the goal of lowering mortality and morbidity associated with hyponatremia.

MATERIALS AND METHODS

This cross sectional study was carried out at the department of department of Neurology, Bolan Medical Complex Hospital, Fatima Jinnah Institute of Chest Diseases and Sheikh Khalifa Bin Zayyed Al Nahyan Medical Complex Quetta. The study duration was one year from September 2021 to September 2022. The overall sample size was 210 by using WHO sample size calculator and by taking 5% margin of error, 95% confidence interval, taking expected percentage of hyponatremia in meningitis patients as 49%.

Inclusion criteria:

- All cases of tuberculous meningitis based on clinical features and CSF routine examination
- Either gender
- Age range 15 to 60 years
- Patients willing to participate in our study

Exclusion criteria:

- Patients who were having other possible causes of hyponatremia like heart failure, cirrhotic patients, nephritic syndrome and other fluid over load states
- Patients who are already on diuretics
- Patients not willing to participate in our study

Data collection: The data collection was started after proper approval from ethical committee of the hospital. All diagnosed cases of meningitis were screened for hyponatremia from day of admission to the day of discharge and GCS plus other clinical parameters e.g. headache, vomiting, confusion, impaired consciousness and seizures etc were recorded. All the required data like name, gender and presence or absence of hyponatremia were documented in a special proforma designed for this research.

Data analysis: Data analysis was carried out by using SPSS version 23. For age and sodium level, Mean ± SD was computed whereas for gender and hyponatremia frequencies and percentages were calculated.

RESULTS

In our study, totally 210 patients were included. The male participants in our study were 94 (44.76%) while female participants were 116 (55.24%). (Figure 1) The mean age (±SD) was 47 (6.66) years. The frequency of patients in age group 18-30 years, 31-40 years, 41-50 years and 51-60 years were 37 (17.62%), 50 (23.81%), 58 (27.62%) and 65 (30.95%) respectively. (Figure 2) Based on serum sodium level, 113 (53.81%) patients were observed with a serum sodium level of < 135 mEq/L whereas 97 (46.19) 94(48%) patients were observed with a serum sodium level of > 135 mEq/L. The mean sodium level in serum was observed to be 133 with SD of ± 4.29. (Figure 3) The overall frequency of hyponatremia in tuberculous meningitis patients was 113 (53.81%). (Figure 4)

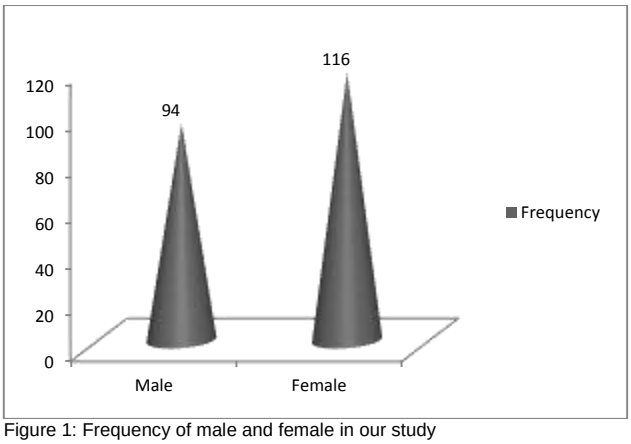

Figure 1: Frequency of male and female in our study

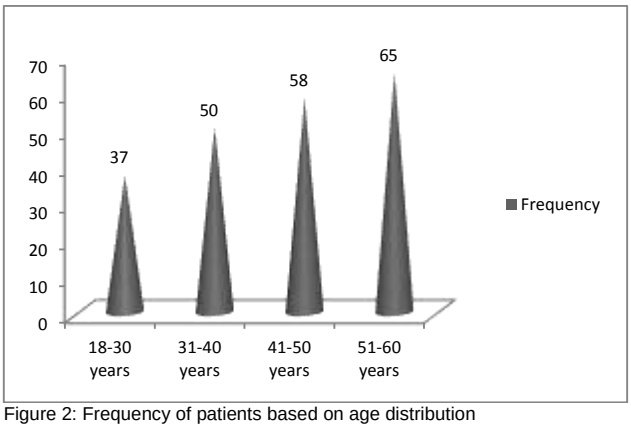

Figure 2: Frequency of patients based on age distribution

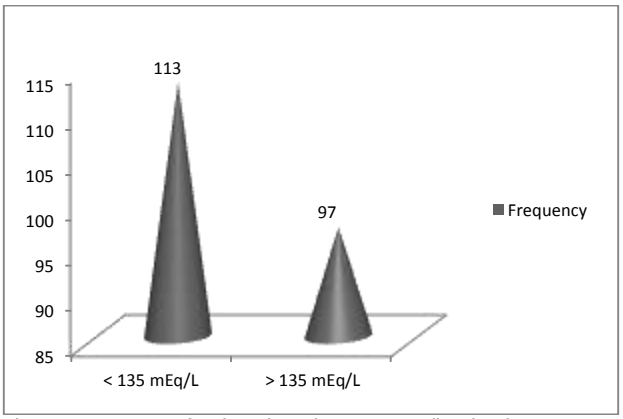

Figure 3: Frequency of patients based on serum sodium level

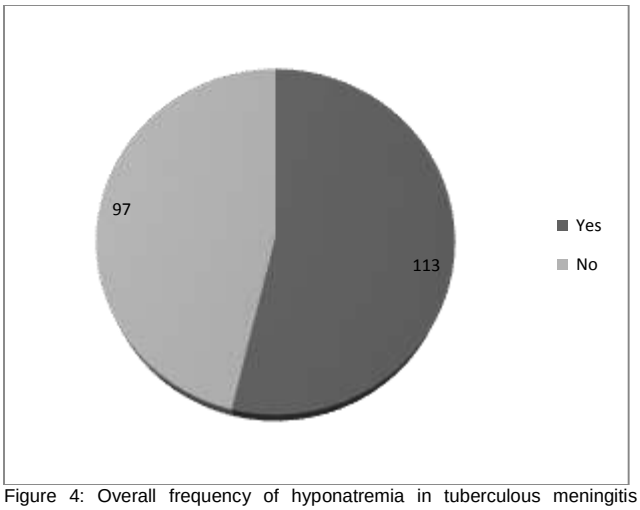

Figure 4: Overall frequency of hyponatremia in tuberculous meningitis patients

DISCUSSION

The prevalence of tuberculosis has recently increased in both developed and developing countries, including the Middle East and southern Asia, making it a serious illness of global significance. The appearance of tuberculous meningitis is incredibly varied, making it difficult to diagnose and more challenging to cure. It is nevertheless a dangerous condition with a high rate of neurologic morbidity and death, and if untreated, it is almost fatal [1, 2].

In our study, totally 210 patients were included. The male participants in our study were 44.76% while female participants were 55.24%. The mean age (±SD) was 47 (6.66) years. The frequency of patients in age group 18-30 years, 31-40 years, 41-50 years and 51-60 years were 17.62%, 23.81%, 27.62% and 30.95% respectively. Based on serum sodium level, 53.81% patients were observed with a serum sodium level of < 135 mEq/L whereas 46.19% patients were observed with a serum sodium level of > 135 mEq/L. The mean sodium level in serum was observed to be 133 with SD of ± 4.29. The overall frequency of hyponatremia in tuberculous meningitis patients was 113 (53.81%). Similar results to our study were reported in a previous study done at Auckland City Hospital, New Zealand the magnitude of hyponatremia was noted to be 49% in tuberculous meningitis [6]. Sometimes patient initially improves with treatment but deteriorates later on. In this casess the possible explanation is that the patient has developed complications like hyponatremia, hydrocephalus or cerebral abscess. In this case serum electrolyte will rule out hyponatremia. Another study done in Karachi by Salekeen S et al. reported hyponatremia in patients with tuberculous meningitis which is in accordance with our findings [7]. In accordance with our study, a previous study done by YAR MUHAMMAD et al. reported 45% prevalence of hyponatremia in patients with tuberculous meningitis [8]. Another study carried out by Goos M et al. reported 53% prevalence of hyponatremia in patients with tuberculous meningitis which is almost similar with our findings [9]. According to previous research, the correlation between hyponatremia and tuberculous bacterial meningitis was 44.7%, with cerebral salt wasting syndrome affecting 50% of patients and the SIADH affecting 9% [10]. A previous study done by Jong et al. reported low prevalence (37%) of hyponatremia in patients with tuberculous meningitis which is not in accordance with our study [11].ss

CONCLUSION

Our study concludes that the frequency of hyponatremia in tuberculous meningitis patients was very high (53.81%). Hyponatremia may have serious implications, including serious neurological problems and death, if it is not properly diagnosed

and treated early. Monitoring the sodium levels in tuberculous meningitis patients is crucial.

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