ORIGINAL ARTICLE

Frequency of Hyponatremia in Children with Pneumonia

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ABSTRACT

Objective: To determine the frequency of hyponatremia in children with pneumonia.
Study Design: Cross-sectional
Place & Duration: Study was conducted at Paediatrics department of Shahida Islam Teaching Hospital, Lodhran for six months duration from 15 January 2020 to15 June, 2020.
Material and Methods: Total 108 patients (children) of both genders with ages 5 months to 15 years admitted for pneumonia were included in this study. Patients detail demographics age, sex and severity of pneumonia were recorded after taking written consent from parents/guardian. Blood sample was taken from the patients to examine serum sodium level. Hyponatremia was defined as serum sodium level less than 135mmol/L. Complete data was analyzed by SPSS 24.0 version.
Results: Total 71 (65.74%) cases were males and 37 (34.26%) cases were females included in this study. 73 (67.59%) patients were ages ≤10 years while 35 (32.41%) were ages 11 to 15 years. 46 (42.59%) patients had severe pneumonia. Hyponatremia was found in 42 (38.89%) patients while 66 (61.11%) patients had serum sodium level >135nmol/L. Hyponatremia was significantly associated with severe pneumonia with p-value <0.05.
Conclusion: Frequency of hyponatremia in children with pneumonia was high and was significantly associated with severe pneumonia.

INTRODUCTION

Pneumonia in children under 5 years of age is the leading cause of death worldwide. Advances in the medicine sector, improved antibiotics and vaccines have decreased the incidence in developing countries of lower respiratory tract infection. However, pneumonia, which accounts for roughly 20 percent of infant deaths, is currently the leading cause of death in children under the age of 5 in developed countries [1], as pneumonia remains a major cause of morbidity and death in developing countries. In 2015, 1,78, 717 children under the age of five died of pneumonia in India, the study, entitled "Fight for breathes," by Save the Children a non-profit organization, said that in 2015, twenty children died of the disease every hour in India that year. [2] [4]

In the absence of timely therapy, the disease requiring hospitalization will progress. Pneumonia-admission kids are seriously ill, and complications frequently arise, including electrolyte irregularities, most commonly hyponatremia. Studies in western countries found that hyponatremia was present in up to 45.4% of children hospitalized by pneumonia. [3,5] Pneumonia hyponatremia was associated with an excessive anti-diuretic hormone (SIADH) secretion syndrome. [6]Excess ADH results in the accumulation of water and expansion of volume, which contribute to serum osmolality decreasing below the reference level. Hyponatremia occurs only when the patient eats or gets some free water supply. In most pneumonia children, fluid therapy is not needed as a result of breathlessness, tiredness, or the risk of aspiration.[7]

The retention of water due to the secondary SIADH degradation of renal water has been identified in several pulmonary conditions, including in children infected by less respiratory tract infection. [8] The current research was thus conducted to detect the occurrence and potential impact of hyponatremia on children between 5 months and 15 years of age as well as the consequence of extreme pneumonia.

MATERIAL AND METHOD

This cross sectional study was conducted at Paediatricsdepartment of Shahida Islam Teaching Hospital, Lodhran for six months duration from 15 January 2020 to15 June, 2020. Total 108 patients of both genders presented with pneumonia were enrolled in this study. Patients ages were ranging between 5 months to 15 years. Detailed demographics including age, sex, severity of disease and complete blood count were recorded after taking written consent from parents/guardian of the patients. Children with other serious conditions were removed from the study such as heart disease, renal disease, and those with no consent were excluded from this study.

2 ml blood sample was taken from each patient and sent to laboratory to examine serum sodium level. Serum sodium level <135nmol/L was defined as hyponatremia. Hyponatremia was considered as mild when sodium level between 130-134 nmol/L, between 125-129 nmol/L considered as moderate and less than 125 nmol/L considered as severe. Association of hyponatremia with severity of disease was examined. All the data was analyzed by SPSS 24.0. Chi-square test was done to stratified hyponatremia by disease severity. P-value <0.05 was taken as significant.

RESULTS

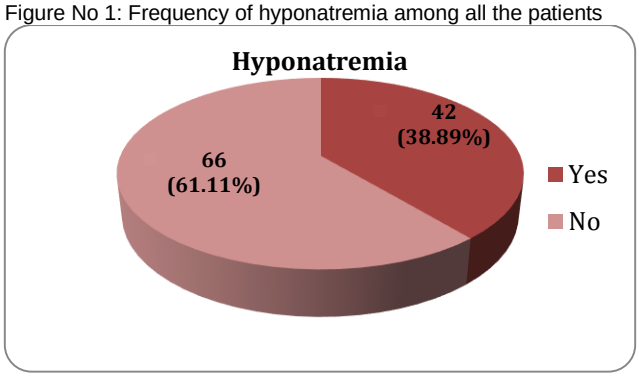
Out of 108 patients, 71 (65.74%) were males and 37 (34.26%) were females in this study. 73 (67.59%) patients were ages ≤10 years while 35 (32.41%) were ages 11 to 15 years. 46 (42.59%) patients had severe pneumonia. (table 1)

Table 1: Baseline details of patients

Variables	Frequency No.	%
Age		
<10 years	73	67.59
11 to 15 years	35	32.41
Gender		
Male	71	65.74
Female	37	34.26
Severe Pneumonia		
Yes	46	42.59
No	62	57.41

Hyponatremia was found in 42 (38.89%) patients while 66 (61.11%) patients had serum sodium level >135nmol/L. (Figure 1)

Figure No 1: Frequency of hyponatremia among all the patients



When we stratified hyponatremia with pneumonia and severe pneumonia, we found that frequency of hyponatremia was significantly high in patients with severe pneumonia 32/46 (59.57%) as compared to patients with pneumonia 10/62 (16.13%), the difference was statistically significant with p-value <0.0001. (Table 2)

Table No 2: Association of hyponatremia with disease severity

Variables	Disease Severity		Total
	Pneumonia (62)	Severe Pneumonia	
Hyponatremia	10 (16.13%)	32 (59.57%)	42
No Hyponatremia	52 (83.87%)	14 (40.43%)	66
Total	62	46	108

Significant association was observed with severe pneumonia p-value <0.0001

DISCUSSION

One of the most popular electrolyte abnormalities in hospitalized patients has been hyponatremia. It complicates many conditions involving respiratory, cardiovascular and central nervous systems etc. and is normal in pneumonia children. Not only that, it can function as a sign of serious disease that contributes to high death and morbidity.[9,10]. We conducted present study to determine the frequency of hyponatremia in children with pneumonia. In this regard 108 chi9ldren were analyzed. Majority 65.74% patients were males while females 34.26%. Most of the patients 67.59% were ages between 5 months to 10 years while 32.41% patients were ages 11 to 15 years. These results were comparable to many of previous studies in which male children were high in numbers 55%-65% and majority of patients were ages less than 10 years [11-12].

In present study we found that 46 (42.59%) patients had severe pneumonia while 57.41% patients had no severe pneumonia. A study conducted by C.K Paraneetha et al [13] regarding hyponatremia in hospitalized children with pneumonia and they reported that out of 122 children 54 (44.26%) patients had severe pneumonia according to the WHO classification of pneumonia.

In this study Hyponatremia was found in 42 (38.89%) patients while 66 (61.11%) patients had serum sodium level >135nmol/L. Mandal PP et al [14] demonstrated that hypnatremia was found in 21% out of 100 pediatric patients of pneumonia. Another study conducted by Jha CB et al [15] reported that hypnatremia was higly associated with pneumonia and the frequency of hyponatremia among children with pneumonia was 80%.

C.K Paraneetha et al [13] reported that hyponatremia was found in 43.44% patients presented with pneumonia. Some other studies demonstrated that the frequency of hyponatremia accounted 32% to 55% among children with pneumonia [16-17].

In our study When we stratified hyponatremia with pneumonia and severe pneumonia, we found that frequency of hyponatremia was significantly high in patients with severe pneumonia 32/46 (59.57%) as compared to patients with pneumonia 10/62 (16.13%), the difference was statistically significant with p-value <0.0001. These results showed similarity to many of previous studies in which children with severe pneumonia were more prone to have hyponatremia as compared to children with pneumonia [14, 18].

Complication incidence is about three-fold in children with hyponatremia as compared to normonatremic patients. Studies also have shown that a comorbidity factor in respiratory compromises is substantially increased pneumonia deaths in patients with hyponatremia [19-20]. The majority of patients reported mild pneumonia in 63.44 percent and moderate pneumonia in 21.5 percent and 15.5% children had severe hyponatremia.

CONCLUSION

Electrolyte abnormalities are the leading cause of increasing morbidity and mortality in children with severe disease. Hyponatremia, is one of the main disorders that affect favorable outcomes in children with pneumonia. We concluded that frequency of hyponatremia in children with pneumonia was high and was significantly associated with severe pneumonia.

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