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ORIGINAL RESEARCH

Assessment of hyponatremia in Pediatric patients with pneumonia

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ABSTRACT

Background: Childhood lower respiratory tract infections (LRTIs) are prevalent and, if left untreated, can have significant rates of morbidity and mortality. Coexisting dyselectrolytemia poses a challenge during management and increases morbidity. The present study was conducted to assess hyponatremia in pediatric patients with pneumonia. **Materials & Methods:** 72 children admitted with pneumonia aged 2 months to 5 years of both genders were **randomly** selected. Clinical features defined as per modified WHO/BTS guidelines were recorded. All children were screened for dyselectrolytemia on admission. Other investigations were done whenever required. **Results:** Out of 72 children, 42 were boys and 30 were girls. Clinical features were fever in 65, cough in 52, abdominal pain in 16, chest pain in 18 and nasal congestion in 31 patients. Grading of hyponatremia was normal in 8, mild hyponatremia in 15, moderate hyponatremia in 19 and severe hyponatremia in 30 cases classify mild moderate and severe hyponetrimia. The difference was significant (P< 0.05). **Conclusion:** Pneumonia in children frequently results in hyponatremia. When hyponatremia is present in children admitted with pneumonia, the morbidity rate increases.

Keywords: hyponatremia, respiratory tract infections, pneumonia

INTRODUCTION

Childhood lower respiratory tract infections (LRTIs) are prevalent and, if left untreated, can have significant rates of morbidity and mortality.[1] According to the World Health Organization's 2005 estimate, LRTIs account for almost 19% of the 10.5 million deaths that occur each year. It is one of the major health issues that affect children under the age of five, necessitating hospitalization. It is also responsible for 30% of global deaths each year, with pneumonia being the primary cause of death. LRTIs include bronchiolitis, bronchitis, pneumonia, and empyema.[2] They are infections classified below the level of the pharynx when there is inflammation of the airways/pulmonary tissue as a result of a viral or bacterial infection. Pneumonia, which is commonly defined as enlargement of the lung parenchyma, is the most common cause of serious illness and mortality in children, accounting for 20–25% of cases in children under the age of four worldwide. Breathing respiratory syncytial virus (RSV) is the most common etiologic cause of bronchiolitis, a common childhood illness.[3]

In severe inflammatory disorders such meningitis, respiratory tract infections, febrile convulsions, and childhood Kawasaki disease, hyponatremia usually develops.[4] Patients who have pneumonia, which is the most common illness seen in pediatric basic practice, are particularly vulnerable to developing hyponatremia as a result of excessive release of the hormone?? antidiuretic hormone (ADH).[5] The syndrome of inappropriate antidiuretic hormone secretion is usually the cause of hyponatremia in pediatric pneumonia cases (SIADH). serum sodium Lower than 135 mmol/L is known as hyponatremia.[6] It is the most typical electrolyte imbalance in clinical settings. In patients the rate of hyponatremia is 15%–30%.[7] The present study was conducted to assess hyponatremia in pediatric patients with pneumonia.

MATERIALS & METHODS

The study was carried out on 72 children with pneumonia aged 2 months to 5 years of both genders. All parents gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. Clinical features defined as per modified WHO/BTS guidelines were recorded. All children were screened

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for dyselectrolytemia on admission. Other investigations were done whenever required. Results thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 72		
Gender	**Boys**	**Girls**
Number	42	30

Table I shows that out of 72 children, 42 were boys and 30 were girls.

Table II Assessment of parameters

Parameters	Variables	Number	P value
Clinical features	Fever	65	0.05
	Cough	52	
	Abdominal pain	16	
	Chest pain	18	
	Nasal congestion	31	
Grading of hyponatremia	Normal	8	
	Mild hyponatremia	15	
	Moderate hyponatremia	19	
	Severe hyponatremia	30	0.04

Table II, graph I shows that clinical features were fever in 65, cough in 52, abdominal pain in 16, chest pain in 18 and nasal congestion in 31 patients. Grading of hyponatremia was normal in 8, mild hyponatremia in 15, moderate hyponatremia in 19 and severe hyponatremia in 30 cases. The difference was significant (P< 0.05).

Graph I Assessment of parameters

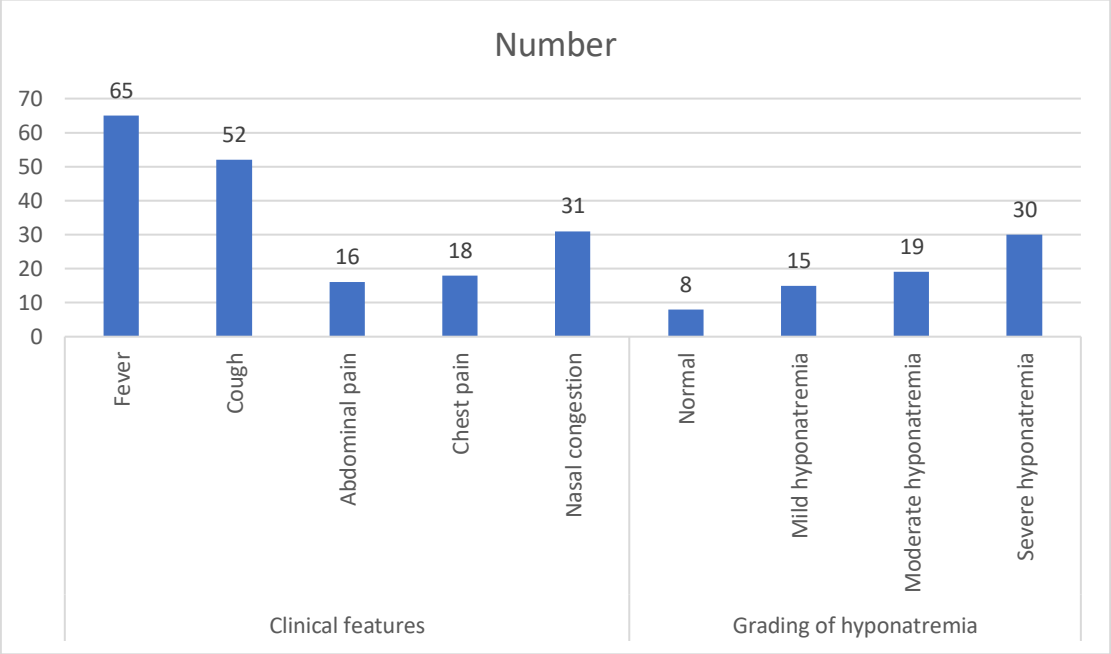

Table III Association of grading of hyponatremia with grading of pneumonia

Grade of pneumonia	Plasma sodium levels			
	Normal	**Mild hyponatremia**	**Moderate hyponatremia**	**Severe hyponatremia**
Pneumonia	4	8	9	18
Severe pneumonia	2	4	5	7
Very severe pneumonia	2	3	4	5

Table III shows that out 39 pneumonia cases, plasma sodium level was normal in 4, mild hyponatremia in 8, moderate in 9 and severe in 18 cases. Out of 18 cases of severe pneumonia, 2 had normal, 4 had mild, 5 had moderate and 7 had severe hyponatremia. Out of 14 cases of very severe pneumonia, 2 had normal, 3 had mild, 4 had moderate and 5 had severe hyponatremia.

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DISCUSSION

About 1% of affected children require hospitalization, mainly due to dehydration, inadequate oral intake, or respiratory deficit. 10% to 15% of hospitalized youngsters require intensive care because they are about to have a respiratory collapse.[8] Maintaining body homeostasis mostly depends on fluids and electrolytes. Sodium is the most important electrolyte; it is the extracellular fluid's abundant cation.[9] The most frequent electrolyte imbalance observed in the intensive care unit (ICU) is hyponatremia, which can occur as frequently as 30% of the time, according to some reports.[10] The present study was conducted to assess hyponatremia in pediatric patients with pneumonia.

We found that out of 72 children, 42 were boys and 30 were girls. Ranjan et al[11] found out the prevalence of hyponatremia in a child with pneumonia. The mean age of children was 2.2 ± 1.9 years. Maximum number of children belonged to age group between 2 months to 24 months. There was a male preponderance a male to female ratio of 2.3:1. Respiratory rate was increased in all the children. The range of respiratory rate for children aged 2 months to 12 months was 52 to 80 per minute and for those above 12 months were 46 to 76 per minute. Hyponatremia was revealed in 86.7% of the children with pneumonia.

We found that clinical features were fever in 65, cough in 52, abdominal pain in 16, chest pain in 18 and nasal congestion in 31 patients. Grading of hyponatremia was normal in 8, mild hyponatremia in 15, moderate hyponatremia in 19 and severe hyponatremia in 30 cases. Jha CB et al[12] determined the prevalence of hyponatremia in children between 2 months to 5 years of children. A total of 50 children of age ranging from 2 months to 5 years who were admitted with clinical or radiological diagnosis of pneumonia were enrolled in the study. Cough was present in 76% of studied children while fever was present in 92%. Clinical diagnosis revealed majority of children with severe pneumonia (40%). Leukocytosis was seen in 70% of children while acute phase reactants CRP was positive in 86% of the children. Hyponatremia was revealed in 80% of the children with pneumonia. Among children between 2 months to 12 months 20% had severe hyponatremia while children in age group between 1 to 3 years 6% had severe hyponatremia and between 3 to 5 years of children 8% had severe hyponatremia. Leukocytosis was demonstrated in 58% of children with hyponatremia, CRP was found positive in 76% of children with hyponatremia. There were 18% of the children who had very severe pneumonia along with severe hyponatremia. While 14% with severe hyponatremia had severe pneumonia and only 2% of the children with severe hyponatremia had pneumonia. In children with moderate hyponatremia 16% of them suffered from moderate pneumonia and 10%had very severe pneumonia and 4%had pneumonia.

We found that out 39 pneumonia cases, plasma sodium level was normal in 4, mild hyponatremia in 8, moderate in 9 and severe in 18 cases. Out of 18 cases of severe pneumonia, 2 had normal, 4 had mild, 5 had moderate and 7 had severe hyponatremia. Out of 14 cases of very severe pneumonia, 2 had normal, 3 had mild, 4 had moderate and 5 had severe hyponatremia. Pande et al[13] assessed dyselectrolytemia in children with severe pneumonia and to correlate dyselectrolytemia with morbidity and hospital stay. Out of 80 children in this study with severe pneumonia, 47 (59%) had electrolyte imbalance. Among the patients with electrolyte imbalance, 31 (39%) patients had hyponatremia followed by hypokalemia in 12 (15%) patients, hypernatremia in 3 (4%) patients, and hyperkalemia in 1 (1%) patient. Among the 17 (21%) children with pneumonia requiring ICU admission, 16 (94%) had dyselectrolytemia and 4 (24%) experienced fatal outcomes.

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that Pneumonia in children frequently results in hyponatremia. When hyponatremia is present in children admitted with pneumonia, the morbidity rate increases.

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