

Serum Electrolyte Levels in Children Having Severe Pneumonia

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Abstract

Background

Electrolyte imbalance is a serious complication in children hospitalized with severe pneumonia. Monitoring of serum electrolyte levels is very essential to prevent the complications leading to increased morbidity and mortality.

Aims and Objectives

To assess serum electrolyte levels in children having severe pneumonia.

Materials and Methods

This descriptive, cross-sectional study involved the assessment of serum electrolyte levels in 21 children aged 2-59 months admitted at Rajindra Hospital, Patiala, between July 2014-August 2015 for the treatment of severe pneumonia.

Results

Children with severe pneumonia were found to have hyponatremia, hypokalemia and hyperkalemia.

Conclusion

Electrolyte disturbances are commonly seen in pneumonia cases, so we should monitor them properly while treating them to avoid complications.

Keywords: Severe Pneumonia, Serum Electrolytes

1. Introduction

The World Health Organization, in its Integrated Management of Neonatal and Childhood Illness guidelines defines severe pneumonia in children as the presence of any of the following- general danger signs, chest indrawing or stridor in a calm child. ^[1] Pneumonia is the single largest infectious cause of death in children worldwide. ^[2] India had under-five mortality rates of 39.4 per 1000 live births in 2018. ^[3] Pneumonia is common in children, especially in the under-five age group everywhere, but is most prevalent in South Asia and sub-Saharan Africa. ^[4] It is more common in developing countries like India. ^[5] Community Acquired Pneumonia (CAP) is the most frequent cause of hospitalization, and is most common cause of admission to intensive care units. ^[6,7]

Electrolyte imbalance is one of the serious complications in hospitalized children with severe pneumonia. ^[8-12] Hyponatremia is one of the most common electrolyte abnormalities in pneumonia. ^[8] Usually, it is a part of the Syndrome of Inappropriate Anti-Diuretic Hormone (SIADH) secretion, ^[9,10,11]

which typically results in water retention with minimal weight gain, usually with no oedema formation, and normal blood pressure. ^[9] According to studies, SIADH occurs in about one third of children hospitalized for pneumonia, and is associated with a more severe disease and a poorer outcome. ^[9] Sometimes hypokalemia is also seen in children with severe pneumonia. ^[8,16] Hypokalemia along with hyponatremia worsens the outcome. ^[8] Hyponatremia and hypokalemia have been associated with adverse outcome in pneumonia cases. ^[8] Babies of asphyxia-related pneumonia develop hyponatremia, hyperkalemia or hypokalemia. ^[8, 16-19]

1. Aims and Objectives

To assess serum electrolyte levels in children having severe pneumonia.

2. Materials and Methods

2.1 Study Design

Descriptive, cross-sectional study.

2.2 Study setting

Rajindra Hospital, Patiala, Punjab which is a tertiary-care hospital.

2.3 Study Duration

July 2014-August 2015.

2.4 Study Group

Children aged 2-59 months hospitalized for severe pneumonia.

2.5 Sample Size

21 children.

2.6 Inclusion Criteria

Children aged 2-59 months hospitalised for severe pneumonia.

2.7 Exclusion Criteria

Children less than 2 months age.

Children more than 59 months age.

Children with renal disorders.

Children with gastrointestinal infections.

Children with Central Nervous System Infections.

Children on drugs that cause electrolyte disturbances.

2.7.1 Definitions

Hyponatremia-Serum Sodium less than 135 mEq/L.

Hypernatremia-Serum sodium more than 155 mEq/L.

Hypokalemia-Serum potassium less than 3.5 mEq/L.

Hyperkalemia-Serum potassium more than 5.5 mEq/L.

2.8 Sampling Technique

All the patients fulfilling the exclusion and inclusion criteria were involved in the study.

2.9 Data Collection

Data was collected in a retrospective manner. Serum electrolyte levels done during the course of hospital stay was recorded.

2.10 Limitations of Study

Small sample size.

As it was a retrospective study, serial measurements of serum electrolytes were not available.

3. Result

Out of the 21 children, 12 (57.1%) were males and 9 (42.9%) were females. 14 (66.7%) were 1 year old or lesser and 7 (33.3%) were over 1 year of age.

Table 1 : Electrolyte Levels in Children with Severe Pneumonia

Serum Electrolyte	Low	Normal	High
Sodium	12 (57.1%)	9 (42.9%)	0
Potassium	1 (4.7%)	14 (66.7%)	6 (28.6%)

12 children (57.1%) had hyponatraemia and 9 (42.9%) had normal serum sodium. There was no association with hypernatraemia. 14 children (66.7%) were normokalaemic, 6 (28.6%) were hyperkalaemic and 1 (4.7%) was hypokalaemic. Most common electrolyte abnormality was hyponatremia (57.1%), followed by hyperkalemia (28.6%) and hypokalemia (4.7%). Hypernatremia was not found in these children.

4. Discussion

In this study, the most common electrolyte abnormality was hyponatremia (57.1%), followed by hyperkalemia (28.6%) and hypokalemia (4.7%). Hypernatremia was not found in these children.

Hyponatremia is considered to be one of the most common electrolyte abnormalities in hospitalized patients. ^[19] In our study also, hyponatremia was the most common electrolyte abnormality. It complicates many conditions affecting respiratory, cardiovascular and central nervous system and is frequently encountered in children suffering with pneumonia. Studies report it as a marker of severity of illness resulting in high mortality and morbidity. ^[20] It is associated with worsened clinical and economic outcomes and indicates a poor prognosis. ^[21,22] A recent single-centre cohort study found the incidence of hyponatremia at hospital admission among CAP patients to be 28%. ^[23] It is important to emphasize that the presence of hyponatremia was associated with not only prolongation of hospitalization, but also with an increase in hospital mortality. ^[21]

Hypokalemia can have deleterious effect on membrane potentials and affect the excitability of cardiac and smooth muscles. ^[1] Severe hypokalemia can lead to life threatening complications like cardiac arrhythmia and respiratory failure. Sudden deaths have been reported in complications associated with hypokalemia without any warning signals. ^[8] Hypokalemia along with hyponatremia worsens the outcome. ^[8] Hyponatremia and hypokalemia were associated with adverse outcome in pneumonia cases. ^[8] Outcome of the cases showed higher mortality in the cases with disturbances in electrolytes than those without electrolyte disturbances. ^[20]

5. Conclusion

Children with severe pneumonia were found to have an association with hyponatraemia, hyperkalaemia and hypokalaemia. Hypernatremia was not found in these patients. Hence early assessment of serum electrolytes will be helpful in these children, for treatment, prevention of complications and thus better recovery. ^[17]

6. Conflict of Interest

There was no conflict of interest among the authors.

7. References

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