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Effect of Mechanical Ventilation on Serum Electrolytes in Preterm Neonates with Respiratory Distress Syndrome

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Abstract

This study was done to evaluate serum electrolytes values of preterm neonates with respiratory distress syndrome who were treated with mechanical ventilation. Serum electrolyte values of sodium, potassium and chloride were analysed. The values were found to be within the normal range when compared with the known standard normal values.

Key words: *preterm; mechanical ventilation; respiratory distress syndrome; serum electrolytes*

Introduction

Preterm babies are often associated with Respiratory Distress Syndrome. Most preterm babies with Respiratory Distress Syndrome are managed by mechanical ventilation. Mechanical ventilation may cause pulmonary capillary

endothelial injury leading to extracellular volume expansion. This in turn may lead to mild increase in intravascular volume.¹ Thus there may be dilution of serum electrolytes in the intravascular compartment leading to their variation from normal values.

Aims and objectives

To assess the serum electrolytes values of sodium, potassium and chloride in the ventilated preterm neonates with Respiratory Distress Syndrome.

Materials and methods

18 preterm neonates who were diagnosed with Respiratory Distress Syndrome and managed by mechanical ventilation in the neonatal ICU were included. Their blood samples were analyzed for serum electrolyte values of sodium, potassium and chloride. These values were compared with known normal values for the age specified.

Results

In this study the values for serum sodium (in mEq/liter), for serum potassium (in mEq/liter), for serum chloride (in mEq/liter) were 135.09 ± 6.11 , 4.9 ± 0.81 , 108.18 ± 7.9 respectively. These values are within the normal range for the age specified.

Following table shows comparison of normal standard serum electrolyte values in preterm neonates and serum electrolyte values of ventilated preterm neonates with Respiratory Distress Syndrome

| Parameters | Normal standard values in normal breathing preterm infants ² (mEq/liter) | Values found in assisted ventilation infants (mEq/liter) |
|-----------------|---|--|
| Serum sodium | 133 to 146 | 135.09 ± 6.11 |
| Serum potassium | 4.6 to 6.7 | 4.9 ± 0.81 |
| Serum chloride | 100 to 117 | 108.18 ± 7.9 |

Discussion

Mechanical ventilation is life saving in many neonates. Most complications are inherent to this intervention.³ In addition preterm infants have low oncotic pressure and critical pulmonary capillary pressure and therefore preterm infants tend to suffer from pulmonary capillary endothelial injury from mechanical ventilation.¹ This leads to extracellular volume expansion which further may lead to mild increase in intravascular volume thereby diluting serum electrolytes. Respiratory alkalosis is also quite common in children receiving mechanical ventilation because the respiratory centre is not controlling ventilation.⁴ This respiratory alkalosis further may cause a mild

reduction in the serum potassium level.⁴ Positive pressure ventilation is also one of the potential causes for SIADH (Syndrome of Inappropriate ADH secretion), which in turn may lead to hyponatremia.⁴ In one of the studies it was found that electrolyte balance, plasma renin levels and aldosterone levels were unaffected despite increased vasopressin and decreased creatinine clearance in assisted ventilated newborns.⁵ This might suggest an unidentifiable factor which may offset the predictable changes in electrolytes' values in ventilated newborns.

Conclusion

The values of serum electrolytes of preterm neonates with respiratory distress syndrome treated with mechanical ventilation were found to be within the normal range when compared with the known standard normal values.

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