

Abstract

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Low magnesium concentration in erythrocytes of children with acute asthma

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BACKGROUND: Magnesium (Mg) is the second most abundant intracellular cation and is involved in numerous physiological functions, including protein folding, intracellular signaling and enzyme catalysis. It has been shown that magnesium deficiency exacerbates pulmonary airways hyper reactivity. Several studies suggest that magnesium level has no effect on asthma but others had shown a contributory effect.

OBJECTIVE: Because of its intracellular abundance the aim of this study was to determine if there was any difference in plasma and intracellular Mg concentrations of children with acute asthma compared to non asthmatic children.

METHODS: Twenty nine patients with acute asthma aged 2 to 11 years admitted to the emergency department of hospital and 37 non asthmatic children with the same age were included in our study. 0.5 mL of heparinized whole blood samples of patients who were meeting inclusion criteria at the onset of admission with bronchoconstriction and before using any medication was drawn and it was immediately sent to the laboratory. Plasma and erythrocytes were separated and stored at -20C and later their Mg levels were quantified with atomic absorption spectrophotometry method.

RESULTS: The average plasma and intracellular magnesium levels in patients were (0.79 +/- 0.098 mmol/L) and (1.17 +/- 0.27 mmol/L) respectively. Results of 37 non asthmatic persons [plasma (0.85 +/- 0.1 mmol/L) and erythrocytes (1.33 +/- 0.21 mmol/L)] showed that there was no significant difference between plasma Mg levels in two groups (p 0.06) but intracellular magnesium level was significantly lower (p 0.03) in patients group.

CONCLUSIONS: These results indicate that intracellular Mg level may be a more accurate method to assess Mg level in patients with asthma. Hence, determination of Mg concentration in erythrocytes may be used in evaluation of asthma pathophysiology. There are recommendations for using intravenous Mg sulfate in acute asthma, and this study supports the rationale for using it in emergency departments for acute severe asthma.

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