Red Blood Cell and Serum Magnesium Levels among Children and Adolescents with Sickle Cell Anemia

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Abstract

Patients with sickle cell anemia (SCA) can acquire many biochemical abnormalities, including altered magnesium levels. However, the roles of magnesium in the pathogenesis and management of SCA need to be determined. The aim of this work was to evaluate magnesium levels among pediatric patients with SCA in Basra, Iraq. The study employed a case-control design and examined 87 patients with SCA (3–15 years old) who had attended the Basra Center for Hereditary Blood Diseases while in a steady state and 90 apparently healthy control subjects. Complete blood count, red blood cell (RBC), and serum magnesium, calcium, potassium, sodium, zinc, and copper levels were measured in all subjects. The results revealed significantly lower RBC and serum magnesium levels among the patients with SCA (3.62 ± 0.42 and 1.35 ± 0.19 mg/dL, respectively) than those among the control subjects (4.47 ± 0.55 and 1.87 ± 0.27 mg/dL, respectively). In addition, compared to the control subjects, the patients with SCA had significantly lower serum levels of potassium, sodium, and zinc; significantly higher serum levels of copper; and significantly higher Ca/Mg and Na/Mg ratios. Among the SCA patients, the RBC magnesium level was significantly negatively associated with the frequencies of vaso-occlusive crises ($r = -0.423$, $P < 0.001$) and disease-related hospitalization ($r = -0.225$, $P < 0.05$). To conclude, the RBC magnesium level, but not the serum magnesium level, is significantly associated with vaso-occlusive crises and hospitalization. Therefore, screening and management of low RBC magnesium levels in SCA patients are required.