Zinc Metabolism in Nephrotic Syndrome

N.		Tümer
S.		Başkan
A.		Arcasoy
A.O.		Çavdar
M.		Ekim

Department of Pediatric Nephrology, Medical School of Ankara University, Ankara, Turkey

N. Tümer, Güvenlik Cad. 90/17, Asagi Ayranci, Ankara (Turkey)

Patients, n = 16 Controls, n = 10

Dear Sir,

It has previously been shown that patients with nephrotic syndrome (NS) are Zn deficient [1–3]. In addition to low serum and plasma Zn concentration, decreased erythrocyte (RBC) and hair Zn levels have also been demonstrated in these patients [2, 3]. The cause of Zn deficiency in NS is not clearly understood. It has been reported that hypozincemia may be due to increased urinary excretion of Zn [2]. However, some investigators have not observed significant urinary Zn losses in these patients [1, 3].

To assess the Zn status of patients with NS, Zn concentrations in plasma, RBC and urine were determined in 16 patients and 10 healthy controls. Their ages ranged from 1.5 to 13 years (12 males, 4 females). All patients had nephrotic range proteinuria ($> 2 \text{ g/m}^2/24 \text{ h}$) and hypoalbuminemia ($< 3 \text{ g/dl}$). All patients had normal renal functions and blood pressures.

Blood samples for plasma and RBC Zn were drawn in fasting states. Twenty-four-hour urine samples were collected in demineralized containers.

Zn concentrations in plasma, RBC and urine were measured with an atomic absorption spectrophotometer (Perkin-Elmer Model 2380) as described previously [4]. The results were analyzed by Student's t test (mean $\pm$ SEM).

Plasma Zn levels in 16 patients with NS were significantly lower than those in normal controls (55.06 ± 4.76 vs. $81.4 \pm 4.12 \text{ } \mu\text{g/dl}$; $p < 0.01$). RBC Zn concentrations were within normal limits (10.78 ± 0.65 vs. $10.34 \pm 0.65 \text{ } \mu\text{g/dl}$; $p > 0.05$). Urine Zn concentrations were significantly lower than those in normal controls (209.643 ± 40.43 vs. $517 \pm 37.1 \text{ } \mu\text{g/24 h}$; $p < 0.001$). Hyperzincuria was not present in any of the patients. Plasma, RBC and urine Zn levels of the patients and controls are shown in table I.

Table I. Plasma, RBC and urine Zn levels (mean $\pm$ SEM)

Urine Zn $\mu\text{g/24 h}$

RBCZn

$\mu\text{g/dl}$

Plasma Zn

$\mu\text{g/dl}$

209.643 ± 40.43

517 ± 37.1 $p < 0.001$

55.06 ± 4.76 10.78 ± 0.65 81.4 ± 4.2 10.34 ± 0.51 $p < 0.01$ $p > 0.5$

The results of this study suggest that Zn deficiency is present in NS but not related to increased urinary Zn losses. The normal Zn concentration in RBC indicated that Zn balance in these patients is not severely disturbed.

We also suggest that hypozincemia may be due to decreased intestinal absorption of Zn or other unknown factors.

References

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