ORIGINAL ARTICLE

Urinary $\alpha_1$-microglobulin and albumin excretion in children and adolescents with type 1 diabetes

Highlights

• Urinary $\alpha_1$-microglobulin, as a marker of tubular dysfunction, is strongly correlated with urinary albumin excretion, which is a marker of glomerular dysfunction, in children and adolescents with type 1 diabetes.
• Tight glycemic control can slow the progression of tubular dysfunction in children and adolescents with long duration of type 1 diabetes.

Aasem SAIF$^1$ and Neveen SOLIMAN$^2$

$^1$Departments of Internal Medicine, and $^2$Pediatrics, Cairo University, Cairo, Egypt

Correspondence
Aasem Saif, 99 El-Mankal Street, Cairo 11451, Egypt.
Tel.: +20 2272 425 92
Fax: +20 22 723 009
Email: aasemsaif@yahoo.com

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Abstract

Background: The present study investigated the correlation between urinary $\alpha_1$-microglobulin as a marker of tubular dysfunction and albumin excretion in children and adolescents with type 1 diabetes (T1D).

Methods: Ninety-two Egyptian patients with T1D were included in the study (mean ± SD age 14.14 ± 5.13 years). The duration of diabetes in all patients was >5 years (mean ± SD duration 8.28 ± 2.62 years) and all had normal renal function. Forty healthy subjects were also included as a control group. Urinary albumin excretion was assessed in all patients and urinary $\alpha_1$-microglobulin was measured in both patients and control in the morning urine specimen.

Results: Analysis of the results showed that patients had significantly higher levels of urinary $\alpha_1$-microglobulin than the controls ($P < 0.01$). Among the patients, there was a strong positive correlation between urinary $\alpha_1$-microglobulin and urinary albumin excretion ($P < 0.01$). Positive correlations were also found between urinary $\alpha_1$-microglobulin and duration of diabetes ($P < 0.01$), HbA1c ($P < 0.05$), and fasting and postprandial blood glucose ($P < 0.05$ for both).

Conclusion: The present study shows that urinary $\alpha_1$-microglobulin is strongly correlated with urinary albumin excretion in children and adolescents with T1D. In addition, it demonstrates the importance of tubular dysfunction as an early and integral component of diabetic nephropathy syndrome in these patients. The results of the present study emphasize the value of tight glycemic control in slowing the progression of tubular dysfunction, especially in patients with a longer duration of diabetes.

Keywords: adolescents, albumin excretion, children, type 1 diabetes, $\alpha_1$-microglobulin.

Significant findings of the study: Urinary $\alpha_1$-microglobulin, as a marker of tubular dysfunction, is correlated with urinary albumin excretion, which is a marker of glomerular dysfunction, in children and adolescents with T1D.

What this study adds: This study highlights the importance of tubular dysfunction, as a component of the nephropathy syndrome, in children and adolescents with T1D.