

Issued since 1920

2021

VOLUME 57 SUPPLEMENT 1

MEDICINA

- ABSTRACTS

**accepted for the International
Scientific Conference
on Medicine**

organized within the frame
of the 79th International
Scientific Conference
of the University of Latvia

Riga, Latvia

ISSN 1648-9233

Abstracts
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English language editor: Andra Damberga

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Significance of urinary Aminopeptidase N in early diagnosis of kidney damage in children with type 1 diabetes mellitus

Vikhrova Iryna¹, Loboda Andrii¹

¹Sumy State University, Medical Institute, Sumy, Ukraine

Background. Diabetes mellitus is a global health problem resulting in social and economic effects. The age-sex standardized incidence rate of T1DM in Ukrainian children and adolescents aged 0–14 years lies between 5–10 per 100,000 population per annum, and it is not as high as in the other EU countries such as Finland (62.3) or Sweden (43.2). However, the possibility of early formation (in five years of disease duration) of micro and macrovascular complications makes the problem of T1DM extremely actual. Diabetic nephropathy is one of the common complications of diabetes. Aminopeptidase N (ANPEP) is an exopeptidase that is expressed by glomerular, mesangial, and renal tubular cells. ANPEP is involved in the conversion of angiotensin III to angiotensin IV. ANPEP in urine is one of the first markers of renal damage when microglobulin levels are within normal limits.

Aim. The aim of the current study was to investigate the features ANPEP levels in urine of children depending on the duration of diabetes.

Methods. We analysed 3 groups of children with type 1 diabetes mellitus and comparison group of children without diabetes from Regional Children's Clinical Hospital in Sumy. ANPEP was measured by ELISA using a Proteome Profiler Human Kidney Biomarker Antibody Array (R&D Systems, Minneapolis, MN, USA). Results were detected with BioRad ChemiDoc Touch. The arrays were analysed semi-quantitatively, using BioRad Image Lab Software.

Results. The study included 47 children with diabetes and 8 children without diabetes. The level of ANPEP in urine increased 2.6-fold in children with the duration of diabetes below one year compared to the control group. ANPEP levels were elevated 3.2-fold in children with duration of diabetes from one to five years. In children with duration of diabetes duration, the marker increased 2.7 times.

Conclusion. Increase urinary ANPEP was observed in the first year of diabetes in children. Measuring the level of ANPEP in urine may be useful for the diagnosis of diabetic nephropathy.

Acknowledgements. We would like to thank the research group of Thomas Boren (Department of Medical Biochemistry and Biophysics/MIMS, Umeå University) for the opportunity to conduct research in framework of collaboration in Erasmus+ (KA1) programme, 2018/2019. The authors declare the absence of potential conflicts of interest.