

[P51] CORNEAL CONFOCAL MICROSCOPY AND CARDIOVASCULAR AUTONOMIC FUNCTION TESTS FOR DETECTING DIABETIC NEUROPATHY IN CHILDREN

Ekaterina Artemova¹, Gagik Galstyan¹, Dmitry Laptev¹, Ivan Dedov¹

¹*Endocrinology Research Center, Moscow, Russian Federation*

Aim: Identification of early markers diabetic neuropathy by corneal confocal microscopy and cardiovascular autonomic function test with spectral analysis of heart rate variability in diabetic children.

Methods: 44 patients with type 1 diabetes mellitus (DM) mean disease duration 4,5 (1-5) years, 6 patients with maturity onset diabetes of the young - 2, 3 (MODY), mean disease duration 4,1 (1-5) years; 5 patients with type 2 DM, mean disease duration 2,75 (1-4) years; and 30 nondiabetic healthy control subjects were recruited in the study. Informed consent was obtained from all patients. All patients and control subjects underwent an evaluation of neurologic signs (Neuropathy Disability Score), symptoms according to the neuropathy symptom score and autonomic cardiovascular tests with spectral analysis of heart rate variability (the low-frequency component (LF), high-frequency component (HF), the LF/HF ratio). All patients underwent examination with the Heidelberg Retina Tomograph III in vivo corneal confocal microscopy (CCM). CCM was performed with assessment of corneal nerve fiber density (CNFD). HbA1c, total cholesterol, high-density lipoprotein, low-density lipoprotein, triglycerides (TG) was measured.

Results: No significant difference was found in vibration, pin prick and temperature perception. CNFD was significantly lower in participants with DM compared to control group (27.7 ± 9.1 vs 35.5 ± 9.4 fibres/mm²; $p < 0,05$). The subjects with type 1 DM showed a lower LF and HF component of heart rate variability, and a lower LF/HF ratio. Modifications in heart rate variability characterized by a reduction in both sympathetic and parasympathetic activity (changes in unmyelinated nerves). Mean HbA1c in patients with type 1 DM was 8.7 % (5.5-17.9), type 2 DM – 6% (5,5 – 7,7), MODY – 6 % (4,4 – 8,1). Only 10 patients had lipid profile in normal range. CNFD significantly negatively correlated with HbA1c ($r = -0,4$; $p < 0,05$), TG ($r = -0,3$; $p < 0,05$), diabetes duration ($r = -0,78$; $p < 0,05$).

Conclusions: This study demonstrates significant abnormalities in corneal nerve structure in children with different types of diabetes in early stages of the disease (duration up to 5 years), despite normal Neuropathy Disability Score. Prospective studies are needed to show the prognostic value of CCM and autonomic cardiovascular testing and clarify the optimal way for screening and management of diabetic neuropathy.