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**EVOLIUCINĖ MEDICINA:
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BESIKEIČIANČIOJE APLINKOJE**

**EVOLUTIONARY MEDICINE:
PERSPECTIVES ON HUMAN DEVELOPMENT AND HEALTH
CONSEQUENCES IN A CHANGING ENVIRONMENT**

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EFFECTS OF CHRONIC PSYCHOLOGICAL STRESS ON AORTIC MORPHOLOGY IN A RAT MODEL OF TYPE 1 DIABETES MELLITUS

Matas ZEKONIS¹, Ruta VOSYLIUTE², Renata SIMKUNAITE-RIZGELIENE², Justinas BALEISIS³, Romualdas RUDYS³, Inga BIKULCIENE^{3,4}

¹Faculty of Medicine, Vilnius University, Vilnius, Lithuania

²Department of Anatomy, Histology and Anthropology, Institute of Biomedical Sciences, Faculty of Medicine, Vilnius University, Vilnius, Lithuania

³Department of Preclinical Research, Centre for Innovative Medicine, Vilnius, Lithuania

⁴Department of Physiology, Biochemistry, Microbiology and Laboratory Medicine, Institute of Biomedical Sciences, Faculty of Medicine, Vilnius University, Vilnius, Lithuania

Contact e-mail: matas0099@gmail.com

Background and Aim: Type 1 diabetes mellitus (T1DM) substantially increases cardiovascular risk through endothelial dysfunction, oxidative damage, and chronic low-grade inflammation. Psychological stress may further aggravate these pathological pathways by altering neuroendocrine regulation and vascular homeostasis. Although stress-related vascular dysfunction has been explored functionally, structural changes in large elastic arteries under combined diabetic and chronic stress conditions remain insufficiently characterised. This study investigated whether chronic psychological stress (CPS) contributes to histomorphological remodelling of the aortic wall in an experimental T1DM model.

Materials and Methods: 35 Wistar rats were randomly assigned into four groups: Control (n=8), Stress (n=10), T1DM (n=6) and T1DM +Stress (n=8). T1DM was induced by a single intraperitoneal injection of streptozotocin (65 mg/kg). CPS was modelled using daily restraint stress for 28 days. On day 29, animals were anaesthetised, the aorta was excised and processed for analysis. The thickness of the *tunica media* and the fenestrated elastic laminae was measured using QuPath 0.4.4. Statistical analysis was performed using Microsoft Excel and SPSS 29.0.

Results: Fenestrated elastic lamina thickness differed significantly between groups ($p<0.001$), with the greatest thickness in the Diabetes+Stress (median 4.30 μm) and the lowest in the Control (2.53 μm). *Tunica media* thickness showed the opposite trend, being thinnest in the Diabetes+Stress (mean 66.47 μm) and thickest in the Control (88.70 μm ; $p<0.001$). Stress alone did not produce statistically significant changes compared with Control.

Conclusions: The combination of CPS and T1DM produces significant aortic remodelling, characterised by thickening of the fenestrated elastic laminae and

thinning of the *tunica media*. CPS alone did not induce significant structural changes but exacerbated diabetes-related alterations, suggesting a synergistic effect that may increase vascular complication risk. Psychological stress assessment should be considered an important component of care for patients with T1DM.

Keywords: aorta, psychological stress, type 1 diabetes mellitus, *tunica media*