

Blood Pressure is Related to Glucose Fluctuation in Longstanding Type 1 Diabetes

Authors: Anna Shalimova, Beata Graff, Anna Szyndler, Jacek Wolf, Magdalena Blaszkowska, Elzbieta Orłowska-Kunikowska, Bogumil Wolnik, Krzysztof Narkiewicz, Medical Univ of Gdansk, Gdansk, Poland

Mechanisms underlying relationship between hypertension and metabolic abnormalities are well established in type 2 diabetes. Much less is known about this link in type 1 diabetes. None of the previous studies has assessed relationship between glucose variability and diurnal blood pressure profile in patients with longstanding type 1 diabetes (DM1). The aim: to investigate the possible association of glucose fluctuation with BP levels in longstanding DM1. Design and methods: We examined 36 patients with longstanding (>20 years) history of DM1 (without overt cardiovascular disease, including hypertension) and episodes of hyperglycemia >160 mg/dL during 24-hour continuous glucose monitoring (CGM). In all patients simultaneous 24-hour CGM and ambulatory blood pressure monitoring (ABPM) were performed. Intima-media thickness (IMT) of the common carotid artery was also assessed. Patients were divided into two groups: with and without severe hypoglycemia <50 mg/dL (n=18 in each group). Results: Compared to patients with hypoglycemia, patients without hypoglycemia had a significantly lower day-time SBP variability expressed as standard deviation (12.6 ± 2.5 and 10.9 ± 3.0 mmHg, respectively, $p<0.05$). In patients without hypoglycemia, mean amplitude of glycemic excursion both up and down was associated with increase in DBP ($r=0.49$, $p<0.05$ and $r=0.59$, $p<0.05$, respectively), whereas in patients with hypoglycemia it was associated with increase in SBP ($r=0.53$, $p<0.05$). In patients without hypoglycemia, time of hyperglycemia was associated with increase in DBP ($r=0.57$, $p<0.05$) and in patient with hypoglycemia – with increase in SBP ($r=0.67$, $p<0.05$). Furthermore, in patients with short hypoglycemic episodes, time of hypoglycemia was associated with increase in SBP ($r=0.57$, $p<0.05$). In patients with hypoglycemia, SBP level had also positive correlation with IMT ($r=0.50$, $p<0.05$). Conclusions: In patients with longstanding DM1, BP is related to glucose fluctuation. While the change in glucose levels towards hypoglycemia is associated with an increase in SBP, hyperglycemia is linked to an increase in DBP. The mechanisms underlying these associations remain to be determined.