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Visit-to-visit systolic blood pressure variability predicts vascular complications in diabetes

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Background & Aims: Hypertension is a strong predictor of major adverse vascular complications. There is limited evidence with regards to visit-to-visit variability in the blood pressure (BP-CV) and association with vascular risk in diabetes. Thus, we studied the association of BP-CV with cardiac and cerebrovascular events (MACCE) and nephropathy in diabetes.

Methods: In a retrospective study of 765 consecutive diabetes patients with documented BP values at consecutive visits (January 2013-December 2014) from a diabetes center in Singapore, BP-CV was assessed using Coefficient of Variation (CV) and percentage CV values were derived by dividing the Standard Deviation (SD) by the mean. Composite renal endpoint was defined as the progression of albuminuria or decline of estimated Glomerular Filtration Rate (eGFR). Multivariable logistic regression and Cox proportional hazards models were built to study associations of BP-CV (systolic (SBP), diastolic (DBP) and pulse (PP) with composite renal endpoint and MACCE after adjusting for age, gender, ethnicity, BMI, baseline eGFR, baseline HbA1c and baseline Systolic BP.

Results: During a mean (SD) follow up period of 32 (6) months, there were 76 (9.93%) deaths, 102 (13.33%) MACCE events and 84 (12.35%) had progression of kidney disease. SBP-CV predicted composite renal endpoint (Adjusted OR=1.04, 95% CI 1.01–1.07, $p=0.018$). Higher SBP-CV but not DBP-CV predicted risk of MACCE (Adjusted HR=1.03, 95% CI 1.01–1.05, $p=0.007$) and PP-CV predicted MACCE (Adjusted HR=1.03, 95% CI 1.01–1.04, $p=0.001$). Patients who had SBP-CV values lower than the 8% cut-off and PP-CV values lower than the 21% cut-off had significantly better overall survival and MACCE free survival (log rank $p<0.05$).

Conclusion: Visit-to-visit variability in BP serves as a good prognostic surrogate marker of MACCE and nephropathy in diabetes patients. We need pragmatic randomized clinical trials to assess whether attaining stable BP by therapeutic measures results in improvement in vascular complications.

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