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Differential effects of novel antidiabetics on arterial stiffness in patients with type 2 diabetes mellitus

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Background: Arterial stiffness flags increased cardiovascular disease risk in type 2 diabetes mellitus (T2DM) patients. There is limited data on how novel anti-diabetic agents affect arterial stiffness.

Purpose: To investigate the effects of novel anti-diabetic agents on arterial stiffness in T2DM patients.

Patients and methods: We enrolled 64 consecutive patients under stable antidiabetic therapy who did not achieve therapeutic targets. Subjects were assessed to receive an additional antidiabetic agent to optimize glucose control; dipeptidyl peptidase-4 inhibitor (DPP4i, n=14), glucagon like peptide-1 receptor agonist (GLP1RA, n=21), sodium/glucose cotransporter-2 inhibitor (SGLT2i, n=21) or long-acting insulin (n=8). Glycosylated hemoglobin (HbA1c) as well as carotid-femoral pulse wave velocity (PWV) and augmentation index (AIx) were measured (as indices of arterial stiffness) were measured at baseline and 3 months after treatment intensification.

Results: There were no differences between the study groups in traditional risk factors, or baseline HbA1c, PWV and AIx levels (p=NS for all). All groups achieved better glycemic control in terms of HbA1c values between baseline and follow-up (for DPP4i: 7.4±0.2% vs 6.7±0.2%, for GLP1RA: 8.3±0.2% vs 6.9±0.1%, for SGLT2i: 7.5±0.1% vs 6.7±0.1% and for insulin 9.8±0.5% vs 7.7±0.4%, $p<0.001$ for all). PWV decreased from 10.0±0.84 to 9.1±0.43 m/sec (p=0.092) in the DPP4i group, from 11.7±0.72 to 10.2±0.74 m/sec ($p<0.001$) in the GLP1RA group, from 1.3±0.54 to 9.6±0.59 m/sec (p=0.001) in the SGLT2i group and from 11.6±1.04 to 11.1±1.02 m/sec (p=0.219) in the insulin group. AIx was also decreased from 34.2±1.89 to 31.5±2.17% (p=0.023) in the DPP4i group, from 29.1±1.52 to 25.6±2.09% ($p<0.001$) in the GLP1RA group, from 29.9±1.44 to 24.2±1.48% ($p<0.001$) in SGLT2i group, and from 28.2±2.33 to 26.2±1.64% (p=0.153) in insulin group.

Conclusions: These preliminary data provide evidence that treatment intensification -particularly with GLP1RA, and SGLT2i- benefits vascular properties, a finding which could partly explain the positive findings of recent randomized clinical trails in this field.