Intravascular ultrasound with virtual histology in assessment of atherosclerotic plaque composition in patients with coronary artery disease and type 2 diabetes mellitus.

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ABSTRACT
Background: Type 2 diabetes mellitus (T2DM) is a serious medical and social problem leading to early disability of patients and high mortality from cardiovascular complications. The development of cardiovascular events is associated not only with the degree of coronary artery stenosis, but also with the structure of the atherosclerotic plaque.
Aim: This study aimed to characterize structure and composition of coronary artery atherosclerotic plaque in target lesion of T2DM patients and patients without diabetes using intravascular ultrasound (IVUS) and IVUS with virtual histology (IVUS-VH).
Methods: We observed 25 patients with coronary artery disease (CAD) with T2DM and without T2DM, which admitted to Endocrinology Research Centre to perform percutaneous coronary intervention (PCI). Patients with CAD and T2DM were included at group 1 and patients with CAD and without T2DM were included at group 2. IVUS and IVUS-VH assessment of target lesion were performed prior to stent implantation. We observed 24 plaques at group 1 and 10 plaques at group 2.
Results: In grey-scale IVUS 2D analysis there were no differences in mean cross-sectional area of the vessel (12.5 mm2 [10.4;15.8] vs. 13.5 mm2 [12.7;16.5], p=0.223, respectively) and lumen area (3.71 mm2 [2.5;4.5] vs. 3.2 mm2 [2.7;3.8], p=0.589, respectively). Plaque burden were higher in patients without T2DM (71.6% [65.5;75.7] vs. 77.6% [74.4; 80.4], p=0.008, respectively). IVUS-VH analysis showed that percent of necrotic core and dense calcium areas were significantly higher in the T2DM group (31.3% [25.3; 36.5] vs. 21.65% [14.3; 27.8], p=0.01 and 4.7% [2.3; 7.8] vs. 2.45 [1.2; 4.05], p=0.046, respectively). Percent of the fibrotic tissue were higher in non-T2DM group (55.35% [49.7; 63.6] vs 67.7 [61.8; 76.5], p=0.004, respectively). There were no differences in percent of lipidic tissue in both groups.
Conclusions: IVUS-VH assessment of coronary artery atherosclerotic plaques showed greater amount of necrotic core and dense calcium in patients with T2DM compared to patients without diabetes.
KEYWORDS: diabetes; atherosclerosis; coronary artery disease; intravascular ultrasound, virtual histology