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**MORPHOLOGICAL CHANGES IN ARTEROSCLEROTIC PLAQUE
IN DIABETIC PATIENTS**

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Actuality. In diabetic individuals, atherosclerotic plaques display unique structural alterations and a higher incidence of specific biomarkers. Research reveals that smooth muscles actin-alpha (a-SMA), a marker of smooth muscle cell activity, is roughly 30% higher than in non-diabetics. CD68, indicating macrophage presence, shows a similar increase. Matrix metalloproteinase type 9 (MMP-9), reflecting breakdown of the extracellular matrix, doubles in quantity. These biomarkers suggest that, within diabetic patients, plaques are more unstable, and inflammation is heightened. MMPs, including collagenase-1 (MMP-1) and gelatinase B (MMP-9), are enzymes crucial for extracellular matrix (ECM) remodelling. MMP-1 degrades fibrillar collagen, impacting tissue repair and atherosclerosis. MMP-9 breaks down gelatine and elastin, influencing wound healing and metastasis. Aberrant MMP expression contributes to pathologies like cancer, arthritis and cardiovascular diseases by degrading ECM

Aim: the main aim of the thesis is to analyze the variation of distribution of the morphological and immunohistochemical changes in in the coronary vessels with atherosclerotic plaque in diabetic patients.

Materials and methods. Coronary artery atherosclerotic plaques from diabetic and non-diabetic patients were analysed using immunohistochemical staining, revealing the presence of CD68, MMP-1, MMP-9, and a-SMA. Patient data was collected from the cardiology departments of several hospitals in Minsk. The corresponding stained pathological slides, used for immunohistochemical analysis, were obtained from the Pathological Anatomical Bureau of Minsk. This allowed for the correlation of clinical information with pathological findings. Quantitative analysis of expression was performed using the programme Aperio Image Scope 12.4.6 and calculation of the ratio of positive markers to the total number of markers present, thereby determining the overall positivity for each marker.

Results and their discussion. Statistical analysis revealed a correlation between the presence of diabetes mellitus (type 1 or type 2) and MMP-1 expression. However, when comparing the mean expression values of all markers in the groups of patients with the presence or absence of DM, as well as depending on the degree of DM compensation, no significant differences were found.

The degree of expression of both types of metalloproteinases depended on the degree of atherosclerotic plaque stability. Thus, in the lipid core and fibrous cover of large unstable atherosclerotic plaques there was more significant expression of MMP-1 and MMP-9. This probably determines a higher risk of rupture of such plaque as a result of degradation of extracellular matrix components. The level of MMP-1 expression was also higher in atherosclerotic plaques in patients who died of acute myocardial infarction.

The analysis revealed no statistically significant correlation between the presence of alpha-SMA and CD68 and the severity of atherosclerotic plaques in the examined diabetic patients. In other words, alpha-SMA and CD68 levels did not consistently increase or decrease with worsening plaque.

Conclusion. Significant expression of metalloproteinases (MMP-1 and MMP-9) results in more active degradation of extracellular matrix components, increases a risk of rupture of atherosclerotic plaques fibrous cover and makes them less stable.