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Morphological Changes in Deforming Osteoarthritis of the Knee Joint Against the Background of Type 2 Diabetes

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ABSTRACT

The scientific study analyzed morphological changes that occurred against the background of deforming osteoarthritis of the knee joint and diabetes. The obtained biopsy materials were examined by histochemical methods.

KEYWORDS: Deforming osteoarthritis, diabetes, knee joint, morphological, histochemical examinations.

Purpose of the study. Morphological changes in knee joint tissues in patients with DOA disease of the knee joint and DOA disease against the background of type 2 diabetes.

Materials and methods. In the scientific study, 90 patients were selected and divided into 2 groups. The first group consisted of 40 patients with deforming osteoarthritis of the knee joint, and the remaining 50 patients were diagnosed with deforming osteoarthritis of the knee joint against the background of diabetes mellitus. Patients were selected. These patients were subjected to general morphological, histochemical: Van Gieson, Alcian blue and Toludin blue and Schick's staining.

The results obtained and their discussion are presented. When histological analysis of the surgical materials extracted for scientific research was performed, the results were as follows. If we look at the macroscopic changes in the cartilage, it was found that in deforming osteoarthritis, the cartilage surface is colorless, soft and uneven. In some parts of the joint surface, the cartilage layer disappears and the subchondral bone is visible, fibrillations, cracks were detected. Microscopic microscopic analysis revealed a significant decrease in proteoglycans and chondrocyte cells and empty lacunae in some parts. Initially, in DOA disease, the cartilage increases in size, absorbs water due to proteoglycans in the cartilage, and then the type II collagen in the matrix is damaged. The amount of proteoglycans in the cartilage tissue decreases, which can be explained by their increased expression in the cartilage and increased enzyme activity. As a result of the progression of DOA disease, fibrillation and rupture of the cartilage matrix of the joint were observed, and their subsequent deepening. As a result of the progression of DOA disease, fibrillation and rupture of the cartilage matrix of the joint were observed, and their subsequent deepening. These cracks spread and deepen as a result of constant physical exertion.

As a result of the increased activity of enzymes in the cartilage, the cartilage in the joint decreases. In diabetic knee osteoarthritis, the cartilage tissue contains a matrix of cartilage intermediate material, a relatively reduced amount of the cellular component of the cartilage tissue, and a slightly increased amount of neutral and acidic mucopolysaccharides, glycosaminoglycans, and mucous substances in the tissue compared to the osteoarthritis **(Figure 1).**

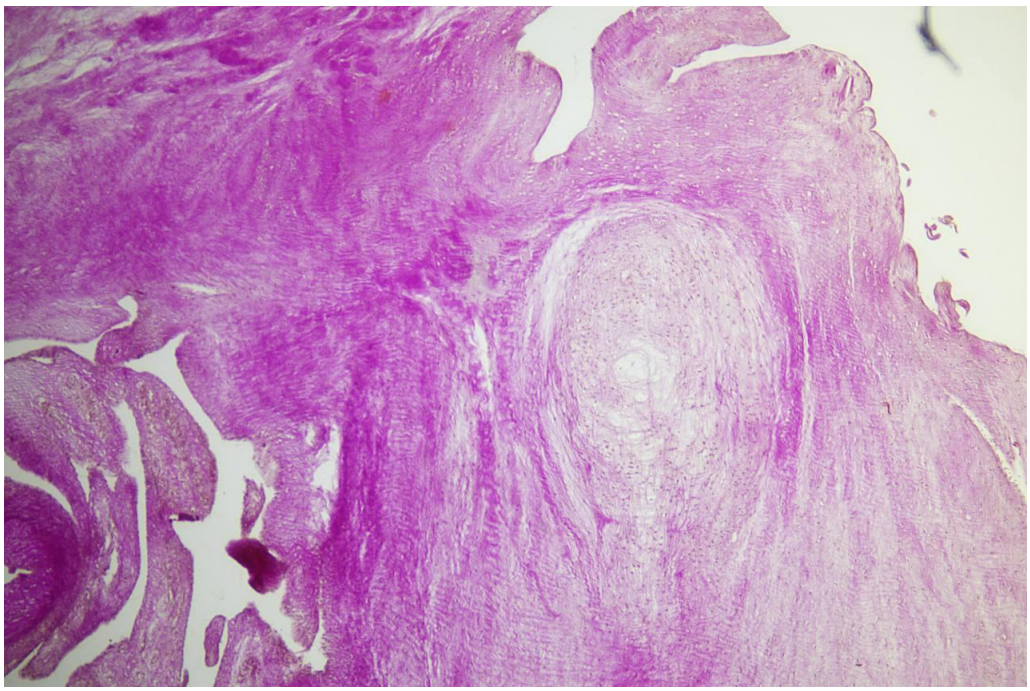

Figure 1. Microscopic view of the cartilage tissue of a patient with DOA. Stained by the Van Gieson method, magnified 200 times.

Decreased amount of collagen fibers in the cartilage tissue (1). In patients with diabetes mellitus, the above changes in the bone tissue were observed more clearly in DOA, an increase in the amount of neutral and acidic mucopolysaccharides in the bone tissue was found, and the content of collagen fibers in the subchondral bone tissue was slightly reduced compared to DOA, sclerotic changes and signs of fullness were detected in the blood vessels and their walls (Figure 2).

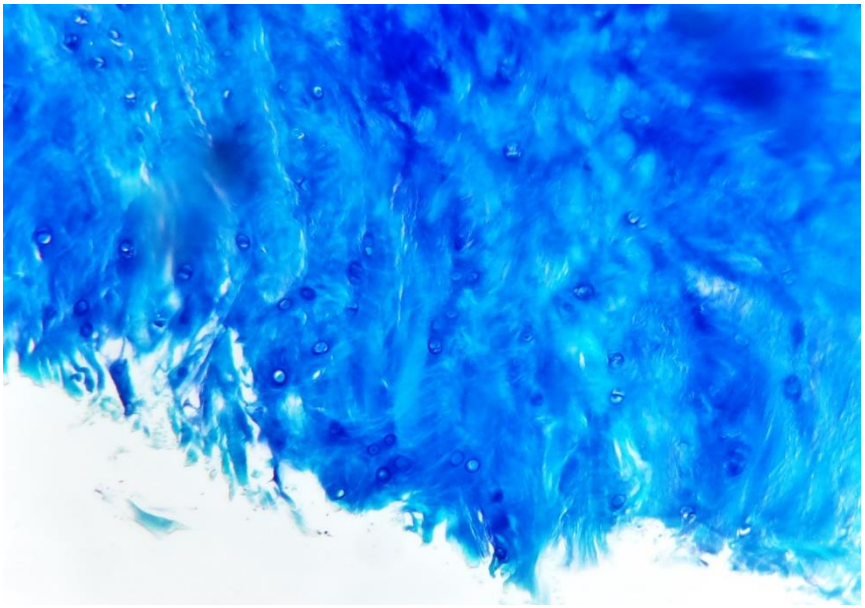

Figure 2. Microscopic view of the cartilage tissue of a patient with DOA on the background of type 2 diabetes mellitus. Stained with toluidine blue, magnified 200 times. The amount of polysaccharides in the tissue composition is increased (1).

In deforming osteoarthritis, inflammatory leukocyte infiltrates, vascular congestion, and fibrosis are observed in the synovial membranes. In deforming osteoarthritis, changes are observed in the reaction of the synovial membrane depending on the progression of the disease and the late stages of the disease. The synovial membrane of patients with deforming osteoarthritis is rich in tissue that has undergone inflammation, fibrosis, and destruction.

CONCLUSION. In DOA of the knee joint, the cartilage on the articular surfaces is pale, rough, there are fibrillations and cracks, and in some areas instead of the articular surface, bone tissue and osteophyte foci are visible. Against the background of diabetes mellitus, these processes are even more pronounced, and pathological changes are more than 2 times deeper, as evidenced by dystrophic changes in the articular surface. In DOA of the knee joint against the background of diabetes mellitus, proteoglycans and chondrocyte cells are located in clumps in the articular cartilage area and are not detected in some areas. It was found that the amount of neutral and acidic mucopolysaccharides, glycosaminoglycans and mucus membranes increased compared to DOA. A decrease in the amount of collagen fibers in the articular cartilage, endochondral ossification, and subchondral sclerosis processes were observed. Leukocyte accumulation in the synovial membrane and venous congestion in the venous vessels were observed.

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