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PATHOMORPHOLOGY OF THE FEMORAL HEAD IN COXARTHROSIS STAGES III AND IV

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Annotation*: The problem of osteoarthritis and the issues associated with its solution are obvious. The clinical classification includes primary and secondary osteoarthritis. The clinical and radiological classification considers four (I–IV) stages of the development of the process according to Kellgren-Lawrence. Finally, there are six stages of damage to the cartilage tissue of the joint and four degrees of prevalence of the pathological process according to the articular surface of the International Society for the Study of Osteoarthritis [1]. Our own data on histological examination of surgical material of femoral heads from patients of stages III and IV of coxarthrosis (CA) allow us to make some additions to the existing ideas of morphology and morphogenesis of osteoarthritis.*

Keywords: *femur, coxarthrosis, treatment.*

The femoral heads were examined after total hip replacement (TETS) from 30 patients diagnosed with stage III–IV CA (18 women, mean age 66.5 years; 12 men, mean age 59.6 years). Dysplastic coxarthrosis – 27 patients, post-traumatic coxarthrosis-3 patients, including 4 patients with contracture. In the process of cutting out the material for histological examination, attention was paid to the macroscopic picture of GBK. The material was fixed in 10% formalin. After decalcification, paraffin sections were stained with hematoxylin and eosin, hematoxylin and picrofuxin.

The studied material allowed us to identify a number of morphological conditions in the main studied areas, namely: in the articular cartilage, subchondral bone, marginal zone of the cartilage plate, cortical plate of the neck, spongy bone. In the articular cartilage, the morphology of the tissues divided into three groups was determined. Articular cartilage 1. Characterized by uneven thickness in different parts, the absence of a cell-free zone. The stratification of chondrocyte groups, their orientation, and multidirectionality, together with the fibrillar component – collagen fibers, relative to the thickness and extent of the cartilage plate are disrupted. Fragmentation of the cartilage tissue on the surface with the separation of tissue complexes in the form of lumens in the deep parts. Discomplexation of structural components in the thickness of articular cartilage. The border line disappears. Subchondral bone. In this anatomical department, it is necessary to distinguish the zone of enchondral osteogenesis, since it largely determines the morphology of osteoarthritis progression. Areas of complete and incomplete ostegenesis are identified in this zone. Complete osteogenesis is determined by the presence of a plate of bone tissue separating the cartilage tissue from the structures of the bone marrow with blood vessels, endostomy. Incomplete osteogenesis is detected in the form of two typesof structures: a - penetration of blood vessels from the bone marrow into the articular cartilage with areas of bone resorption, altered cartilage tissue, and areas of enchondral osteogenesis; b – preservation of cartilage tissue in the adjacent bone beams of the zone of enchondral osteogenesis. osteogenesis, the presence of newly formed cartilage tissue in these areas. Articular cartilage 2. It is characterized by the progression of incomplete osteogenesis, the presence of vessels and connective tissue in the cartilage plate with resorption of cartilage tissue to the articular surface.

On the articular surface of hyaline cartilage, areas of fibroblasts with vessels, zones of cartilage resorption are determined. Division of articular cartilage into separate fragments. Connective tissue forms the articular surface and is located on the spongy bone. The presence of newly formed hyaline cartilage in the subchondral parts. Defects with fractures in bone and cartilage tissue. The presence of structures that determine reparative processes, in the form of newly formed cartilage and bone tissues – cartilage and bone calluses, connective tissue with blood vessels. Anatomical rearrangement of this complex of tissues, leading to deformation of the organ. Marginal zone of articular cartilage of the femoral head. The zone of conjugation of tissues of the same origin, but different in structure and functional load: cartilage tissue; synovial membrane; cortical plate of the neck and fossa of the BC. In the cartilage plate, areas with its thickening are identified; areas with thinning of hyaline cartilage and its replacement with connective tissue and spongy bone. Acute hematoxylin and eosinomt is synovitis with an overgrowth of connective villi tissue, lymphocytes in the stroma, displacement of the synovial lining and obliteration of the joint cavity. In the cortical plate of the femoral neck – thinning, fragmentation, osteoporosis with wide vascular channels. Spongy bone of the femoral head. In the spongy bone are determined: osteoporosis; adipose and hematopoietic bone marrow; newly formed connective tissue; chronic osteomyelitis; foci of necrosis, myxomatosis, psevodokist. In idiopathic and posttraumatic coxarthrosis, arthrosis revealed: displacement of the tissues of the head of the CD relative to their initial ratios as a manifestation of mechanical action; the presence of hyaline cartilage; cartilage and bone calluses as a manifestation of the reparative process. The revealed morphological changes in the tissue complex during the formation of CA stages III-IV allow us to consider the morphogenesis of osteoarthritis as an interaction of cartilage, bone tissue, tissues of the marginal zone of the CD head, bone marrow structures of the zone of enchondral ossification, blood vessels and connective tissue. The morphological basis of this interaction is determined by the essential role of vessels performing not only trophic (service), but also morphogenetic functions. It is characterized by the germination of blood vessels, pericytes, connective tissue cells from the bone marrow into the articular cartilage. This is accompanied by cartilage resorption, enchondral osteogenesis, or lack of osteogenesis; the tissue complex reaches the surface of the cartilage plate. Connective tissue with vessels-fibroblasts, collagen fibers on the surface of the cartilage plate on the one hand provide resorption of cartilage tissue, and on the other hand, up to a certain time, form the articular surface.

In the marginal zone of the articular surface of the CD head, the restructuring of the tissue complex leads to the proliferation of connective tissue, displacement of the synovial lining and obliteration of the joint cavity. Fractures are detected in the area of interaction of the hyaline cartilage of the joint with the subchondral bone. This leads to a displacement of the tissues relative to their original positions. Subsequently, during the healing processes – the fusion of morphogenetically closely related tissues – a kind of histotectonics and anatomical deformation of the CD head is carried out. Obliteration of the joint cavity leads to the formation of contractures, restructuring of tissues in the hip joint. In terminal states, pathological junctions are formed between the acetabular cavity and the head of the CD – syndesmosis, synchondrosis, which are the morphological basis of contractures. All of this makes it possible to evaluate morphological changes in the GBC during SC, based on the understanding that this complex of tissues that carry a supporting function is associated with gravity. As a result, in the morphogenesis of coxarthrosis, along with vessels, a significant place belongs to mechanomorphosis and a hereditary factor that determines the behavior of tissues. Based on this, it is possible to create a model of coxarthrosis from the initial changes in the joint tissues to its

morphogenetically terminal states.

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