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MORPHOLOGICAL STRUCTURE OF THE LEFT VENTRICLE PAPILLARY MUSCLES OF THE HUMAN'S HEART

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Prevalence of cardiovascular disease and mortality from them in Ukraine occupy the first place in recent years. Therefore, the increased interest in the researches of structural and functional features of the internal relief of the ventricles and valvular apparatus of the human heart remains relevant due to the rising necessity for in-depth study of the etiology and pathogenesis of cardiovascular diseases. The valvular apparatus of the heart is a complex configuration formed by the valve leaflets, chordae tendineae and papillary muscles. The normal functioning of the valvular apparatus of the heart depends primarily on the relationship of its structural components, deviations in the structure of which leads to uncoordinated operation of the entire valvular complex and disruption of hemodynamic of the heart. And to identify structural changes that occur in pathology of the heart requires data on its morphological structure in the norm.

The aim of the study was to investigate the macro-, micro- and submicroscopic structure of the papillary muscles of the left ventricle of the human heart. The material for the study were papillary muscles found in the cavities of the left ventricles of 20 human's hearts. Macroscopic, light and electron microscopy methods were used.

Macroscopically on the anterior and posterior wall of the left ventricle, there was mainly one papillary muscle. Two papillary muscles were found in 68% of cases, three papillary muscles in 21% of cases, four in 7% of cases, and five in 4% of cases. But it is more correct to speak not about the number of papillary muscles but about the number of functional units, each of which consisted of several papillary muscles. It should be noted that often visualized not single papillary muscles, but their complexes. In 92%, two groups consisted of two to five papillary muscles and connected to each other. In 25%, the papillary muscles fused at the base. Sometimes the papillary muscles are connected by muscular septa. The shape of the papillary muscles was cylindrical, conical, or irregular. Papillary muscles with several heads were also observed. Electron microscopy method showed that the papillary muscles were externally lined with a single layer of endothelial cells that lay on a continuous basal membrane. In the center of the endotheliocyte was an elongated oval nucleus filled with an electron-transparent nucleoplasm with euchromatin located in the center and heterochromatin, which occupied a peripheral position in the nucleus. In the cytoplasm of the endothelial cell were localized a few general organelles, a large number of pinocytic vesicles. The luminal surface of the endothelial cell contained submicroscopic projections in the form of individual microvilli. The peripheral collagen-elastic layer was localized under the endothelium. This layer is formed by loose fibrous connective tissue with elastic fibers located in it, which quantitatively prevailed over collagen fibers and fibroblastic cells. Collagen fibers formed thin bundles. Between the collagen and elastic fibers identified fibrocytes, which had a strongly elongated irregular shape, an elongated nucleus along the cell in which heterochromatin predominated, a reduced volume of cytoplasm with less development of organelles. The basis of the papillary muscles was constituted by contractile cardiomyocytes, which had an elongated cylindrical shape, they were interconnected each other by intercalated discs and formed functional fibers that anastomosed and formed a three-dimensional network. Besides, among contractile cardiomyocytes identified the elements of the conduction system of the heart - the Purkinje cells. Between the bundles of cardiomyocytes were localized thin layers of loose fibrous connective tissue with blood vessels.

Thus, an in-depth study of the morphology of myoendocardial formations such as papillary muscles of the ventricles of the human heart will improve methods of diagnosis and treatment of malformations and heart disease because this is what clinical medicine needs today.