

**MORPHOLOGICAL FEATURES OF DIFFERENT PARTS
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Introduction. The heart normally lies on the middle part (middle piece, front, front sheet) tendon center, forming a pericardial area. Accordingly, in tissue specimens from the contact zone of the diaphragm it is observed cardiac fibrous tissue, covered on one side pericardium, on the other side – the peritoneum. However, it can be assumed that the heart is increased in size increases the area of contact of the latter with the diaphragm, therefore, the heart will be in contact not only with the tendon center, but will be drawn into costal zone of diaphragm, in muscular tissue under enlarged heart pressure may be dystrophic, atrophic and sclerotic changes. And in the center of the fibrous tissue of the tendon from the effects of the same pressure – thinning. What in the complex will lead to a change of heart cavity parameters – expand and deepen.

In addition, according to the authors [1-3], at age tendinous part of the diaphragm increases and changes its shape, as well as structural changes in the muscle of the diaphragm are less compact bundles of muscle, thinning them, and between them the appearance of additional slots. In our opinion, this can also be the basis for changes in cardiac cavities, especially in combination with cardiac hypertrophy.

Height standing diaphragm, depending on age, sex, constitution, intrathoracic and intra-abdominal pressure, will also affect the shape and size of the heart that reflects the completeness of cardiac heart seizure. The shape and size of the heart and vary in different respiratory phases [4,5].

Objectives. The study of anatomical variability of the diaphragm structure attracted the attention of the heterogeneity of its layers in different departments: coated pleura, pericardium, peritoneum, and that was the reason for conducting this study.

Material and methods. To study the morphological features of diaphragm using methods such color as hematoxylin and eosin, pikrofuksyn by van Hyzonu. Made microscope specimens studied in «Olympus BX-41». This part of the thesis kindly made by the department of pathological anatomy (Professor VD Markovskiy, Professor IV Sorokina, assistant Miroshnichenko, MS, assistant professor AN Pliten) Kharkiv National Medical University.

Results and discussion. In the macroscopic study of diaphragm marked its heterogeneity. So, in the muscular (costal) portion where the diaphragm is covered by the parietal pleura (diaphragmatic part

of the parietal pleura), its thickness 0.3-0.6 cm, consistency dense-elastic, serous membranes (parietal pleura and parietal peritoneum) smooth, shiny, the cut fabric gray-reddish color. In the central parts of the diaphragm – tendon center, including in the area where there is its fusion with the pericardium (pericardial diaphragmatic part), the diaphragm thickness of 0.25-0.3 cm with dense consistency, serous membranes (pleura parietal / parietal leaf of pericardium and parietal peritoneum) site in the pericardial area in contact with the diaphragm of the left ventricle tissue its whitish gray color, and in contact with the right ventricle diaphragm – whitish-gray, in some parts of reddish color. In addition, in the region of the heart and the diaphragm contact is marked flattening (sometimes retraction) of the diaphragm downward, which is formed as a result of heart pressure on the diaphragm, the shape and size of which depend on the macroscopic parameters of the heart, which, in turn, caused the constitutional features of a person, the presence of heart disease resulting in a change in its macroscopic indicators, etc. (In the literature this region is described as heart cavity / recess or pericardial area). In the same area of the diaphragm is determined by a whitish-gray color, rather compact, a few towering over the diaphragm surface in the direction of the pericardial cavity, fissure separating diaphragm to touch the place with her left and right heart.

Microscopic structure of the diaphragm in the various sections is also different.

Microscopic examination of the fragment diaphragm tissue from the muscular portion (rib portion of the diaphragm), adjacent to the pericardial area on the right and/or left, where the part of the thoracic cavity the diaphragm is covered by the parietal pleura, it is noted that both the surface (mesothelial) layer presents the lining consisting of typical for a single-layer flat epithelium thin flattened cells. These cells lie on a basal membrane, below which is a thin layer of dense, loose connective tissue layer and a layer of dense connective tissue hyalinized collagen fiber bundles. All connective tissue structures at coloring pikrofuksin by van Gieson stained bright red or dark red color. Between the fibers of the connective tissue located vessels of the microvasculature and nerves. Described structural elements form a serous integument (parietal pleura and peritoneum), subserous layer and subpleu-

rar and subperitoneal fasciae (fascia diaphragmatica and fascia endoabdominalis respectively) (Fig. 1, 2).

In subserous departments on both sides (more pronounced in subperitoneal departments) are determined by the inclusion of adipose tissue composed of fat cells, having the form of rounded-oval, colorless voids of various sizes with H & E stain, which are organized into groups or segments (Fig. 1, 2).

In the above-described layers is a massive muscle layer with large muscle fibers which are uniformly stained cytoplasm eosin. The nuclei of the muscle fibers are preferably elongated, oval-shaped, and in most cases are located at the periphery. Moreover, their long axis oriented parallel to the core muscle fiber. Between the muscle fibers are very delicate and thin layer of connective tissue called endomysium. Endomysium contains many microvascular and nerve fibers. In some fields of a small amount of fibroblasts in endomysium determined (Fig. 3).

Microscopic examination of the diaphragm fragment from adjacent areas where the diaphragm is covered by the chest cavity in a portion of the parietal pleura, and the other – adherent to the pericardium, it is noted that the diaphragm from the thoracic and abdominal cavities is covered with a layer of mesothelium lying on the basal membrane, followed by a dense layer of loose connective tissue and the presence of fat, as described in the above areas.

In the middle part of the diaphragm from a fragment of the adjacent area to the left is determined by the layer of striated muscle tissue composed of muscle fibers with uniformly colored eosin cytoplasm and peripherally-ranging round-oval, oblong nuclei. In comparison with the above described areas of the fragment marked decrease of muscle and connective tissue components. If the first fragment of the diaphragm muscle fibers have a large size, the fragment diaphragm muscle fibers of various sizes with a tendency to decrease. In some cases, muscle tissue is completely absent, and the fragment was introduced fibro-fatty tissue with larger fields of fibrosis at the

peak of the transition to the thinning of the tissue toward the center of the depression and cardiac events hyalinosis. Trophic and innervation of the diaphragm fragment provide vessels of the microvasculature and nerves, localized between the muscle and connective tissue fibers.

In an adjacent area to the right microscopic structure of the fragment is not very different from the structure of the diaphragm muscle fragment of the zone, with the exception of dense connective tissue in subpericardial departments and significantly less adipose tissue there. From the side of the abdomen differs from muscular part of the diaphragm is not detected.

Microscopically fragment in the contact area of the diaphragm of the left heart and diaphragm noted that this fragment is lined by the peritoneal and pericardial cavities mesothelium one layer, which lies on the basal membrane. Below the basement membrane is noted a small layer of loose connective tissue, which is followed by a massive layer of dense connective tissue places with hyalinosis phenomena. Between the fibers of the connective tissue are vessels of the microvasculature and nerves. Muscle tissue in the passage of the diaphragm is not (Fig. 4).

By studying the slides aperture fragment from the center of the area of contact of the right half of the heart and the diaphragm, it is noted that the inner and outer sides, ie, pericardial cavity from the abdominal cavity and, this passage aperture as well as the previous ones, is lined with a single layer of mesothelial cells lying on the basal membrane, which is located below a layer of connective tissue. In previous aperture fragments observed both loose and dense connective tissue in the same ratio, the predominance of this fragment is marked dense connective tissue. In the middle part of the fragment is determined by the aperture a small amount of thinning of the muscle fibers, which terminate in the connective tissue structures, sometimes with symptoms lipomatosis. Microvascular and nerve fibers pass in between the muscle and connective tissue fibers.

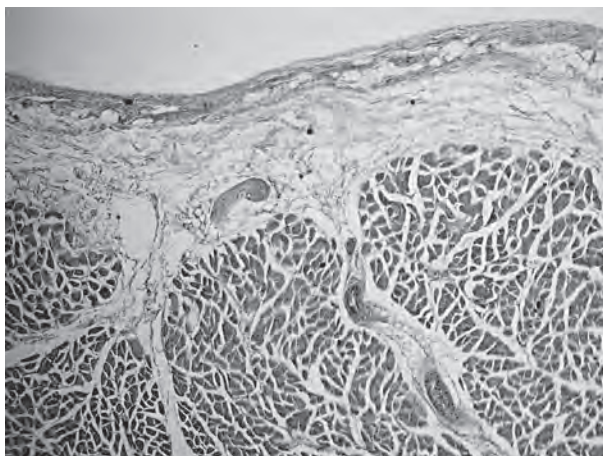


Fig. 1. Structure of the muscular part of the diaphragm, pleural side – top to bottom: the parietal pleura, subserous layer and subpleural fascia with the inclusion of the adipose tissue, muscle tissue layer. H & E stain, x 40.

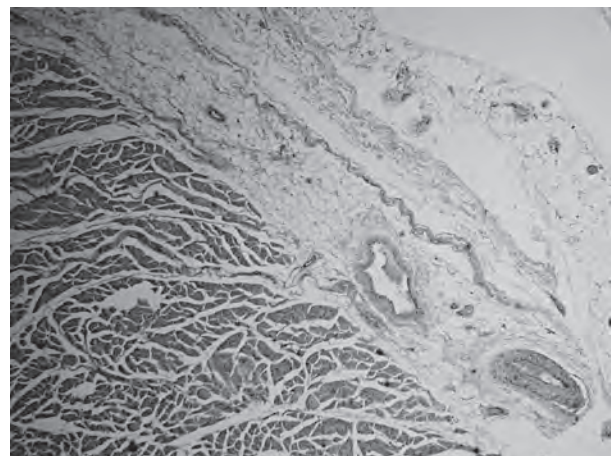


Fig. 2. Structure of the muscular part of the diaphragm, the abdominal side – top to bottom: parietal peritoneum, and a layer of subserous subperitoneal fascia with the inclusion of the adipose tissue, muscle tissue layer. H & E stain, x 40.

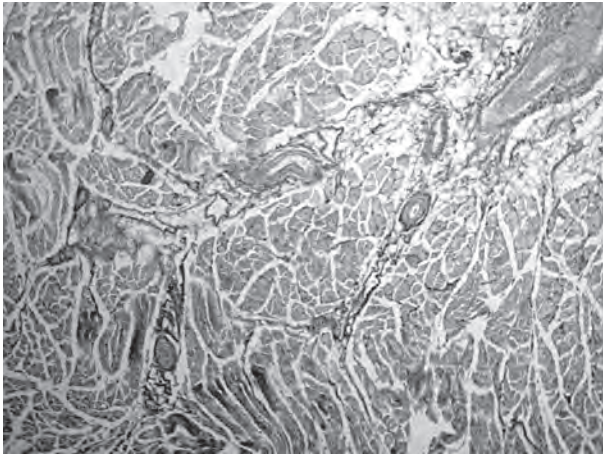


Fig. 3. The layer of the muscular part of the diaphragm muscle, between the muscle fibers are very delicate and thin layer of connective tissue – endomysium, which comprises a plurality of microvascular and nerve fibers. Painting pikrofuksin by van Gieson, x 40.

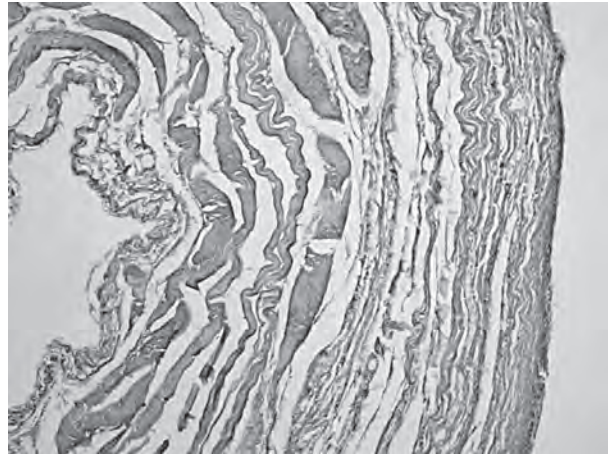


Fig. 4. The structure of the diaphragm from the area of contact of the left heart and the diaphragm – the pericardium and peritoneum lie on the basal membrane, beneath which are located subserous – subpericardial and subperitoneal respectively – layers of loose connective tissue, between which there is a massive layer of dense connective tissue in places with signs hyalinosis, muscle tissue is absent. Painting pikrofuksin by van Gieson, x 40.

Described on macroscopic examination furrow separating diaphragm to contact the place of the left and right heart, histologically at the peak of the transition “pits” is characterized by fields of dense connective tissue, sometimes with symptoms hyalinosis. The left part of the fragment is much thinner than the right and is represented by fibro-fatty tissue – namely, fibrous with layers of fat that are fields fibrosis subserous and serous layers, covered with mesothelium (parietal leaf pericardium and parietal peritoneum). The fat component is more pronounced from the abdominal cavity. Muscular fibers in the diaphragm portion are not present. The structure of the right side of this fragment is virtually indistinguishable from the structure of a fragment taken

from the center of the contact area of the right heart and the diaphragm, however, in this zone are more pronounced degenerative and atrophic processes in the muscle fibers, as well as there are areas with hyalinosis phenomena.

Conclusions

1. Pericardial playground consists of two unequal parts, respectively contact with the right and left ventricles.
2. The morphological structure of these parts differs presence or absence of muscle fibers.
3. The shape and sizes of the parts depend on the shape and size of the ventricles.
4. The main reasons affecting the structure of the site are pericardial heart weight and age of the person.

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МОРФОЛОГІЧНІ ОСОБЛИВОСТІ РІЗНИХ ВІДДІЛІВ ДІАФРАГМИ

Дуденко В. Г., Вдовіченко В. Ю., Курінний В. В.

Резюме. Проведено дослідження з метою встановити ступінь різноманітності різних шарів діафрагми людини в різних її відділах, покритих плеврою, перикардом або очеревиною. Матеріал було оброблено та пофарбовано гематоксиліном і еозином, а також пірофуксіном по ван Гізону. Мікроскопічне дослідження проведено на мікроскопі «Olympus BX-41». Аналіз результатів проведеного дослідження показав, що перикардальна площадка складається з двох нерівних частин відповідно зіткненню з правим і лівим шлуночками, морфологічна будова цих частин різниться наявністю або відсутністю м'язових волокон, форма і розміри частин залежать від форми і розмірів шлуночків, основними причинами, що впливають на будову перикардальної площадки є маса серця і вік людини.

Ключові слова: морфологія діафрагми, перикардальна площадка, м'язова частина, ендомізій.

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МОРФОЛОГИЧЕСКИЕ ОСОБЕННОСТИ РАЗЛИЧНЫХ ОТДЕЛОВ ДИАФРАГМЫ

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Резюме. Проведено исследование с целью установить степень разнородности различных слоев диафрагмы человека в различных её отделах, покрытых плеврой, перикардом или брюшиной. Материал был обработан и окрашен гематоксилином и эозином, а также пирюфуксином по ван Гизону. Микроскопическое исследование проведено на микроскопе «Olympus BX-41». Анализ результатов проведенного исследования показал, что перикардиальная площадка состоит из двух неравных частей соответственно соприкосновению с правым и левым желудочками, морфологическое строение этих частей различается наличием или отсутствием мышечных волокон, форма и размеры частей зависят от формы и размеров желудочков, основными причинами, влияющими на строение перикардиальной площадки являются масса сердца и возраст человека.

Ключевые слова: морфология диафрагмы, перикардиальная площадка, мышечная часть, эндомизий.

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MORPHOLOGICAL FEATURES OF DIFFERENT PARTS OF THE HUMAN DIAPHRAGM

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Abstract. A study to determine the degree of heterogeneity of the various layers of the human diaphragm in its various departments, coated pleura, pericardium or peritoneum. The material was processed and colored with hematoxylin and eosin, and pirofuksin by van Gieson. Microscopic examination was carried out on microscope «Olympus BX-41». Microscopic examination of the fragment diaphragm tissue from the muscular portion (rib portion of the diaphragm), adjacent to the pericardial area on the right and/or left, where the part of the thoracic cavity the diaphragm is covered by the parietal pleura, it is noted that both the surface (mesothelial) layer presents the lining consisting of typical for a single-layer flat epithelium thin flattened cells. These cells lie on a basal membrane, below which is a thin layer of dense, loose connective tissue layer and a layer of dense connective tissue hyalinized collagen fiber bundles. All connective tissue structures at coloring pikrofuksin by van Gieson stained bright red or dark red color. Between the fibers of the connective tissue located vessels of the microvasculature and nerves. Described structural elements form a serous integument (parietal pleura and peritoneum), subserous layer and subperitoneal fasciae (fascia diaphragmatica and fascia endoabdominalis respectively). In subserous departments on both sides (more pronounced in subperitoneal departments) are determined by the inclusion of adipose tissue composed of fat cells, having the form of rounded-oval, colorless voids of various sizes with H & E stain, which are organized into groups or segments. In the above-described layers is a massive muscle layer with large muscle fibers which are uniformly stained cytoplasm eosin. The nuclei of the muscle fibers are preferably elongated, oval-shaped, and in most cases are located at the periphery. Their long axis oriented parallel to the core muscle fiber. Between the muscle fibers are very delicate and thin layer of connective tissue called endomysium. Endomysium contains many microvascular and nerve fibers. In some fields of a small amount of fibroblasts in endomysium determined. By studying the slides aperture fragment from the center of the area of contact of the right half of the heart and the diaphragm, it is noted that the inner and outer sides, ie, pericardial cavity from the abdominal cavity and, this passage aperture as well as the previous ones, is lined with a single layer of mesothelial cells lying on the basal membrane, which is located below a layer of connective tissue. In previous aperture fragments observed both loose and dense connective tissue in the same ratio, the predominance of this fragment is marked dense connective tissue. In the middle part of the fragment is determined by the aperture a small amount of thinning of the muscle fibers, which terminate in the connective tissue structures, sometimes with symptoms lipomatosis. Microvascular and nerve fibers pass in between the muscle and connective tissue fibers. Described on macroscopic examination furrow separating diaphragm to contact the place of the left and right heart, histologically at the peak of the transition "pits" is characterized by fields of dense connective tissue, sometimes with symptoms hyalinosis. The left part of the fragment is much thinner than the right and is represented by fibro-fatty tissue – namely, fibrous with layers of fat that are fields fibrosis subserous and serous layers, covered with mesothelium (parietal leaf pericardium and parietal peritoneum). The fat component is more pronounced from the abdominal cavity. Muscular fibers in the diaphragm portion are not present. The structure of the right side of this fragment is virtually indistinguishable from the structure of a fragment taken from the center of the contact area of the right heart and the diaphragm, however, in this zone are more pronounced degenerative and atrophic processes in the muscle fibers, as well as there are areas with hyalinosis phenomena. The analysis of the results of the study showed that pericardial area consists of two unequal parts, respectively contact with the right and left ventricles, the morphological structure of these parts varies by the presence or absence of the muscle fibers, the shape and size often depends the shape and size of the ventricles, the main reasons affecting the structure of the site are pericardial heart weight and age of the person.

Keywords: morphology of diaphragm, pericardial plate, muscular part, endomysium.

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