



Morphological Features of the Lungs of the Domestic Rabbit

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ABSTRACT

The increasing demand for the products of rabbit breeding requires the study of the body as a whole and its individual systems important for life activity, including the respiratory organs, which to date remain unstudied. This work is devoted to the elucidation of peculiarities of the structure of the lungs of the domestic rabbit (*Oryctolagus*). By methods of dissection and morphometry the structure of lungs was studied and their belonging to a certain comparative-anatomic type was determined. As a result of the study the lung lobe structure in the domestic rabbit was established, their topography, shape, sizes, mass, coefficient of asymmetry by mass were determined.

Keywords:

domestic rabbit, morphology, lungs, morphometry, atrial lobe

Introduction. The lungs in mammals are, as a rule, lobular formations. This is caused by the necessity of their stretching in different directions and to different degrees. The degree of complexity of lung organization in animals is not the same: it is simple in lower terrestrial vertebrates and becomes more complex as the general organization of animals increases. It is known that organs of animals can be modified depending on a way of life and general load on an organism, including lungs, the variability of which, is not only of general biological interest, but has a certain importance in revealing physiological processes of respiration under changing environmental conditions.

Purpose of study: Study of morphological features of rabbit lungs

Objects and methods: The object of our study were the lungs of physiologically mature rabbits. Using manuals on methods of quantitative analysis in biology: five animals were studied (the authors recommended three and above). The study began with determining age and taking parameters (weight and body length). After opening the thorax, the lungs

recede by about 1/3 of their volume, hence, the change in their size has a dramatic effect on their shape. To preserve the natural shape of the organs, a special preliminary preparation was carried out. Without opening the cadaver, an ordinary (8-10%) solution of formalin was poured through the trachea under pressure, and it was injected into the lung parenchyma with a syringe by puncturing the intercostal muscles. After autopsy we determined the shape of the lungs, their position in the thoracic cavity, size, coefficient of asymmetry by weight.

Results and discussion

The structure of rabbit lungs in the natural state together with the heart and other organs (aorta, esophagus, thymus remnants, etc.) in general displays the shape of the thoracic cavity, gradually expanding downwards. The structure of organs consists mainly of parenchyma (respiratory tissue), while bronchi, vessels and others account for a small part of them. Mass of the lungs is 10.75 ± 0.55 g, they are paired, therefore, according to this index and shape, and consequently, respiratory capacity, as a rule, are not symmetrical because of some prevalence of the right one of them. Typical division of lungs is

not observed in all placental animals. In primitive groups and detachments of placental animals: in most insectivores, in many rodents and some others it also does not appear in a characteristic form. The left lung usually remains underlobed or atypically lobed, and on the right, the lobular division may be incomplete (by the number of lobes) or uncharacteristically pronounced (with shallow slits). In animals, as a rule, the left lung is smaller in mass and volume and more narrowed, and, consequently, less functionally active and mobile. Sometimes there is an asymmetry in development of identical lobes between the left and right lungs, which is usually manifested in the area of lung apices. The domestic rabbit has a reduction of the left apical lobe. The lung asymmetry coefficient by mass is 1.15. The left lung is smaller in both volume and mass, and more constricted, therefore, less functionally active and less mobile than the right. Total lung length is 3.15 ± 0.59 , width 1.75 ± 0.79 , thickness 0.25 ± 0.95 mm. The right lobe length is 0.65 ± 0.49 , width 0.77 ± 0.65 , and thickness 0.35 ± 0.57 mm. The length of the left lobe is 0.88 ± 0.86 , width 0.78 ± 0.97 , and thickness 0.58 ± 0.78 mm, respectively.

The wide variety, existing forms of lung lobes among mammals can be classified and arranged in 17 basic comparative-anatomical types. Due to a pronounced reduction of the left apical lobe in various degrees, three lung types are observed in rodents and hares: narrowed-extended, transitional and dilated-shortened. Depending on the type, the form of diaphragmatic lobes of the lungs significantly changes (their shortening or elongation). All variety of forms of lung lobe division observed among mammals is subordinate to certain regularities. It is arranged in a unified system of classification into certain comparative-anatomical types observed in the course of adaptive evolution. The formation of lobes in the lungs according to their number, shape and position is not random, but natural and inherent only in mammals. Rabbit lungs, according to our data, belong to the VIII type, they have an almost complete reduction (atrophy with the remnant remaining) of the left apical lobe with typical expression of all other lobes in both lungs. The

right lung, includes the apical, cardiac and diaphragmatic lobes with the diaphragmatic lobe the most pronounced, which is conditioned by the type of breathing of the animal. The cardiac lobe has a special bronchus on the inside of its anterior margin. A small, unpaired lobe adjoins the right lung, which is probably indicative not only of the organization of the lungs themselves, but also shows the relation of the lungs to the heart with its large vessels, and to the diaphragm, separated from the heart through this lobe. As a result of the study we established the lung lobe structure in the domestic rabbit, determined their topography, shape, size, mass, the coefficient of asymmetry in the mass. It can be assumed that the identified features of the structure of the organ are determined by the type of breathing of this species of animal providing gas exchange, in the tissues of the lung.

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