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Morphological features of the lungs in post-COVID-19 period

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Background. The pandemic of coronavirus disease 2019 (COVID-19) caused by SARS-CoV-2 is an urgent problem of the modern health care system. The lungs are the main target organ for this infection. The pathogenesis and morphological changes in the lungs in COVID-19 are well understood. Morpho-functional state of the lungs in people who had recovered from COVID-19 is an under-researched issue.

The aim of the study was to identify the morphological features of the lung in individuals in post-COVID-19 period.

Methods. The material of the study was autopsy material: fragments of the lung tissue from 96 deceased (59 men and 37 women). The cause of death was acute or chronic cardiac/cardiovascular failure, dislocation of the brain stem, pulmonary artery thromboembolism, intoxication. The average duration of the post-COVID-19 period was 148.6 ± 9.5 days. Slides were stained with hematoxylin and eosin, picrofuchsin according to van Gieson.

Results. Survey microscopy of the slides in all cases revealed pneumosclerosis of varying severity, characterized by excessive growth of connective tissue fibers perivascular and directly in the vessel's walls of various calibers, around the bronchi and bronchioles or directly in their walls, in the interalveolar septa with its thickening. In 46 cases (47.9%) pneumosclerosis was combined with atelectasis and emphysematous changes. In all cases, predominantly focal immune cells infiltration was detected in the fields of pneumosclerosis. In 23 cases (24.0%), metaplastic changes were detected in the foci of sclerosis, characterized by the presence of hyaline cartilage, bone and adipose tissues. In 20 cases (20.8%), metaplastic and dysplastic changes were detected in the epithelial layer of the deformed bronchial tree. In 17 cases (17.7%), areas of dystrophic calcification were noted in the foci of pneumosclerosis. In all cases, against the background of the above-described changes in the lung tissue outside the pneumosclerosis foci, hemodynamic disturbances (edema, vascular plethora, diapedetic hemorrhages, thrombosis) were noted.

Conclusion. Sclerosis, focal immune infiltration, emphysematous and atelectatic changes, metaplastic and dysplastic changes, dystrophic calcification and hemodynamic disturbances were detected in the lungs of individuals in post-COVID-19 period. The changes identified by the authors, firstly, help to explain pulmonary manifestations of post-COVID-19 syndrome, and secondly, should be the basis for the development of rehabilitation and treatment methods for such category of patients.

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