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ANALYSIS OF PATHOMORPHOLOGICAL CHANGES IN THE LUNG TISSUE IN PULMONARY EMBOLISM IN MALIGNANT TUMORS

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ABSTRACT

Autopsies and retrospective analysis revealed several diseases of the risk group. It can be chronic hepatitis, arterial hypertension, diabetes mellitus, and obesity, and chronic bronchitis, varicose veins of the legs, coronary artery cardiosclerosis, coronary heart disease, and atherosclerosis. Therefore, in patients with malignant tumors, it is necessary to pay attention to existing risk factors, such as hepatitis, obesity, arterial hypertension, coronary heart disease, varicose veins of the legs, chronic bronchitis, diabetes mellitus, atherosclerosis, and coronary heart disease.

KEYWORDS: *Thromboembolism, Venous Thrombosis, Malignant Tumors, Pulmonary Embolism.*

INTRODUCTION

Actuality of the topic: 6 million people in all countries of the world are diagnosed with a new primary form of cancer. The incidence and mortality from malignant tumors vary from country to country. Morbidity and mortality from malignant tumors in European countries have now

come to the fore at the expense of stomach and lung cancers. The practical significance of the problem of pulmonary artery thromboembolism is currently determined by the apparent increase in the frequency of pulmonary artery thromboembolism in various diseases, a significant increase in the frequency of postoperative and posttraumatic embolisms that occur frequently during complex surgical interventions; in addition, deaths from pulmonary artery thromboembolism in highly developed countries are the third leading cause of death after ischemic heart disease and stroke.

The purpose of the study: to improve the assessment of pathomorphological changes and causes of death in malignant tumors complicated by pulmonary artery thromboembolism

MATERIALS AND METHODS

We made extensive use of data from a retrospective study of autopsy statements and medical history of 128 corpses who died during treatment in the treatment departments of the Republican Specialized Scientific-Practical Medical Center of Oncology and Radiology from 2004 to 2018.

THE MAIN FINDINGS AND RESULTS

Retrospective analysis of the autopsy data copy revealed that the thromboemboluses were directed from the right ventricular cavity of the heart to the pulmonary artery shaft and that the vessel was completely occluded or occluded, with small pieces of thromboembolus located in different parts of the small and segmental capillaries of the lung. In particular, 39 (30.5%) corpses reported the presence of thrombus particles in the right pulmonary arteries, while 75 (58.6%) corpses reported the presence of thrombus fragments in the arteries of both lungs. In 14 (10.9%) cases, only small capillaries of the left pulmonary artery were occluded with small fragments of a thrombus stuck in the pulmonary trunk. In the small and segmental branches of the pulmonary arteries, 77 (60.2%) corpses were found to have small thrombus fragments.

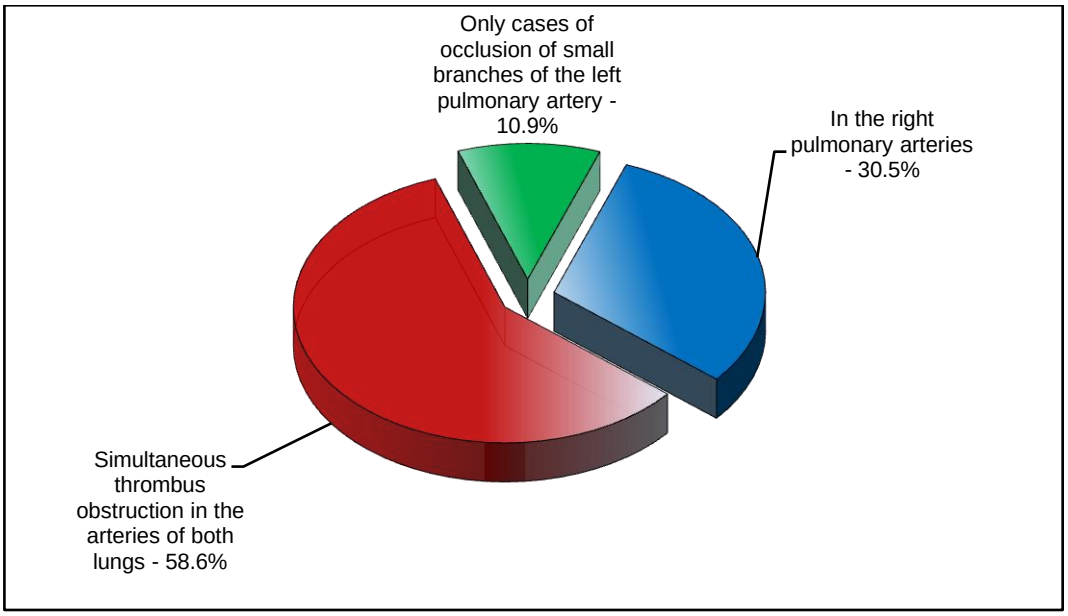

Figure 1. The degree of occurrence of thromboembolic fragments on the localization in the pulmonary arterial branches

According to the results of retrospective studies conducted in the study, hemorrhagic infarction in the lungs developed from macroscopic changes in lung tissue. The infarct is conical in shape, clearly demarcated from the surrounding tissue, with the base facing the pleura. Fibrin deposits are seen in the pleura of the infarct area. The dead tissue is dense, granular, dark red in color. The lungs are enlarged, the edges are sharp, the pleura is clear, the lung tissue is soft, elastic in consistency, pale red, airy, pinkish-red on the incision surface when cut, a large number of small or large foamy secretions. There was venous stagnation in the tissues, plasma saturation, edema, stasis in the capillaries, and numerous diapedesis hemorrhages. As a result of acute venous stasis, the alveolar capillaries dilate (lung tumor), and there is blood flow into the alveoli. These changes intensify and fibrosis develops.

Looking at the results of the data analysis, macroscopic changes were observed mainly in the lung fragments. In 26.8% of observations, signs of necrosis developed in the lung tissue of the corpses. These changes were found in 18.8% of corpses in one piece, 6.3% of corpses in two or more pieces, and 10.1% of corpses in polysegmental injuries. Injuries to the lower extremities accounted for 21.8% and in the upper extremities to 5.1%. The total injury of lung tissue in each part of the lung ranges from 60% to 70%.

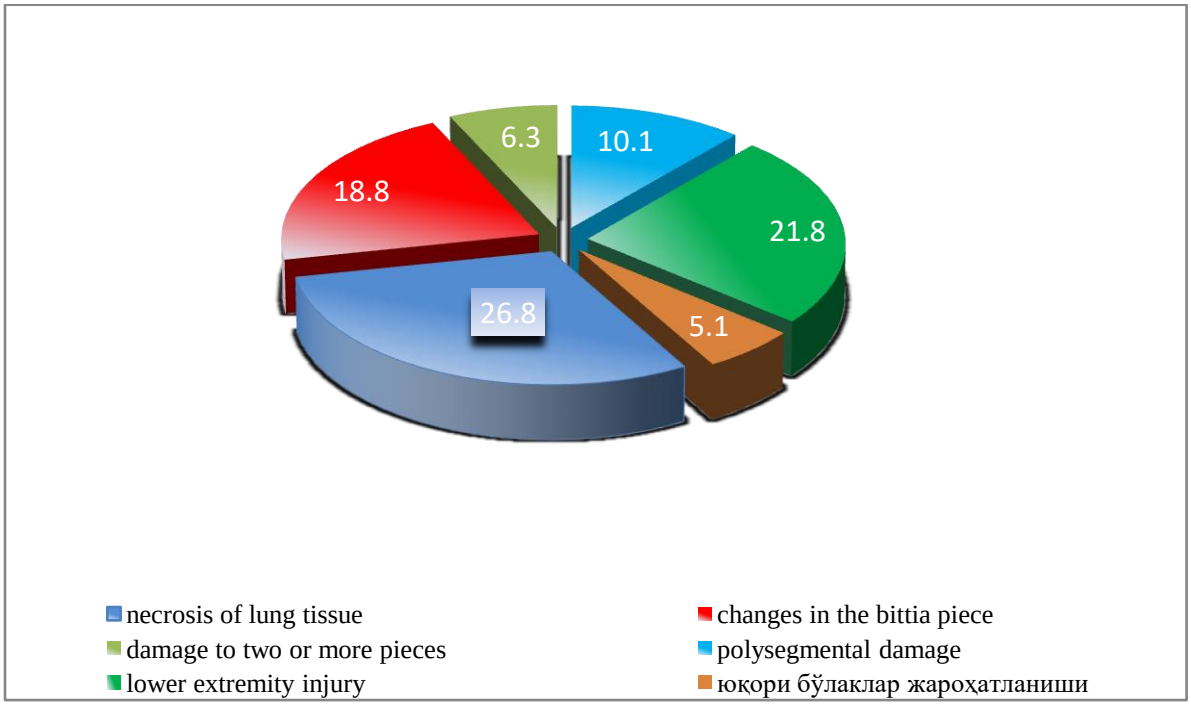

Figure 2. Analysis of macroscopic changes in lung tissue

In the histology of lung tissue in 76.6% of cases there is an enlargement of the alveolar cavity, in some places there is a violation of the trophism of alveolar cells, an increase in volume; hypochromic staining of the nuclei, broad and bright cytoplasm, vascular richness of the stroma of the alveolar barrier, flattening of the endothelium; eccentric location of the nuclei and richness of fibrocytes. Lymphocytes accumulated in some areas of the interstitial tissue and erythrocytes leaked from the blood vessels.

Interstitial tumor of the alveolar-capillary membrane consists of erythrocytes, a tumor consisting of a small number of segmented nuclear leukocytes, lymphohistiocytic, macrophage infiltrations, increased permeability of arterial vessel walls, venous blood stasis in the vessels, plasmorrhagia, interstitial edema of interstitial endothelial lesions, I. Erythrocytes, neutrophils, and macrophages are often found in alveolar fluid, hyaline membranes are located along the alveolar barriers. The walls of the alveoli are fibrous, fibrous interstitial pneumonia is observed. Sometimes bronchopneumonia was added and found to be fatal.

On histological examination of the bronchial walls, the mucous layer was composed of multilayered squamous cell epithelium; the submucosal layer is composed of fibrocytes. The mucous layer is full, swollen, mucus production in glandular and goblet cells is sharply increased, the covering epithelium of the mucous membrane is displaced, the walls of the bronchi and bronchioles thicken due to cellular infiltration and edema, leading to impaired bronchial drainage activity.

In the vascular wall of the bronchial wall, hypoxia also increased vascular wall permeability, plasmorrhagia developed, and intima layer suffocation resulted in injury to endothelial cells, basal membranes, muscle tissue, and vascular wall fibrous structures.

The results of histological examination show that the tumor in the lung tissue - 76.6% (98 people), interstitial tissue tumor - 52.3% (67 people), pulmonary hemosidrosis - 25.7% (33 people), pulmonary anthracosis - 57, 1% (73 people), bleeding into the lung tissue - 64.8% (83 people), inflammation of the lung tissue - 30.5% (39 people), the presence of fluid in the alveolar cavity - 69.5% (89 people) .

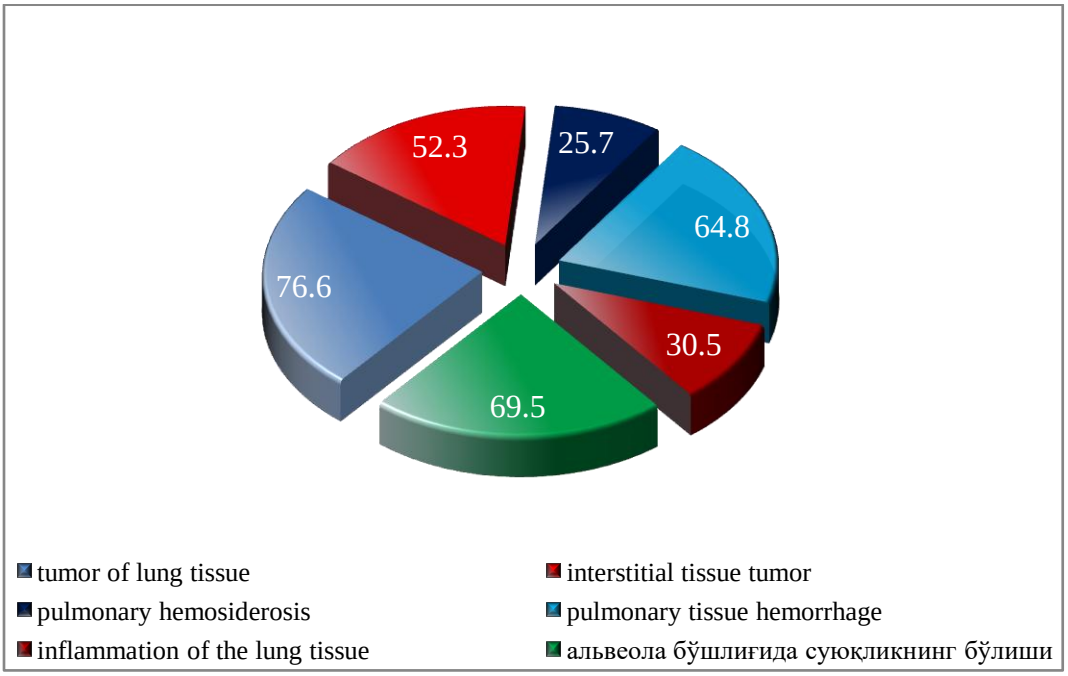

Figure 3. Occurrence rates of microscopic changes in lung tissue.

Analysis of macroscopic and microscopic changes in the endothelium of the pulmonary vascular wall in corpses who died of pulmonary artery thromboembolism in malignant tumors showed

that, macroscopically, the vascular wall mucosa was thickened, swollen, bruised, and microscopically viewed in some places narrowing of the endothelial spaces was observed.

Histological examination revealed the development of tumors due to disruption of the movement of plasma fluids through the alveolar-capillary walls as a result of suffocation of endothelial cells in the pulmonary vessels. In all the corpses examined, fully formed and developed emboli were found. When the detected thrombus composition was observed, it was observed that it consisted of platelets, erythrocytes and a small number of leukocytes, and that they were located not only in the anterior position of the vascular wall, but also in the free state in the vascular cavity. Cases of changes in erythrocytes as a result of changes in blood properties due to complete cessation of blood flow in the arteries have been observed.

As a result of these advanced pathomorphological changes, deaths from various causes have been observed in malignant tumors. If we compare the prevalence of deaths from malignant neoplasms among young people, the number of deaths from COPD in the age group of 30-39 years is 3 (2.3%), and the number of deaths from other complications is 10 (7.8%); Deaths from COPD in the age group of 40-49 years - 23 (18.0%), deaths from other complications - 10 (7.8%); In the age group of 50-65 years, 39 (30.5%) deaths were due to COPD, and 6 (4.7%) deaths from other complications; Among 66-year-olds and older, deaths from COPD were 33 (25.8%) and deaths from other complications were 4 (3.1%).

TABLE 1 AGE-RELATED PREVALENCE OF CAUSES OF DEATH IN MALIGNANT NEOPLASMS

Age of patients	The main cause of death was pulmonary embolism (n = 98).		Deaths from other causes (n = 30)	
	abs.	%	abs.	%
	57,8±3,5		56,6±3,5	
30-39 years old	3	2,3	10	7,8
40-49years old	23	18,0	10	7,8
50-65years old	39	30,5	6	4,7
66 and older	33	25,8	4	3,1

Thus, pathomorphological changes in the formation of thromboembolic complications in the lungs were found to occur in the perivascular areas. In the alveolar walls there is an increase in vascular wall permeability, dominated by clearly developed interstitial tumors containing erythrocytes, platelets, a small number of leukocytes; impaired movement of fluids through the alveolar-capillary membranes; led to tumor development and severe arterial hypoxemia.

Based on the results obtained, it was found that those who died of pulmonary artery thromboembolism in malignant neoplasms developed signs of necrosis in the lung tissue of 26.8% of corpses from macroscopic changes in lung tissue. Histological examination revealed tumors in the lung tissue - 76.6%, bleeding into the lung tissue - 64.8%, inflammation of the lung tissue - 30.5%, the presence of fluid in the alveolar cavity - 69.5%.

CONCLUSION

To conclude based on the data of macroscopic and microscopic and hemostatic changes obtained in our research, in order to prevent deaths from COPD complicated by malignant tumors in the postoperative period, it is necessary to prescribe treatments that improve blood circulation, as well as dangerous tumors, special attention should be paid to the rheological changes in the blood that occur during the treatment of patients with chemical drugs and radiation, as well as risk factors such as chronic hepatitis, obesity, diabetes. The practical use of these indicators allows timely diagnosis of pathological changes in blood components, their level, prevalence and hemodynamic significance.

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