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Features of morphological changes in the lungs in the dynamics of the development of an experimental model of surgical sepsis

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Abstract

The purpose of our study was to study lung morphology in modeling on a background of severe purulent inflammatory disease of soft tissues.

Methods:

Experiments were done in 36 rabbits of weighing 1500-2500 g, being fed standard laboratory rations. Each group consisted of 12 rabbits. All animals were divided into two groups: Control group 12 intact (uninfluenced) rabbits (without modeling of pathological process);

Main group 24 rabbits with experimental model of sepsis on a background of severe purulent inflammatory disease of soft tissues (necrotizing fasciitis type I). Experimental model of sepsis was reproduced on the background of necrotizing fasciitis type I according to our original method. Modeling was performed as follows: rabbits on an empty stomach were injected intraperitoneally with antilympholine-Cr at a dose of 0.03 mg per 100 g of animal weight under ether anesthesia within two days. At the third day, five points of back of animal were injected subcutaneously with 34 ml of 30% suspension of animal autoexcrement diluted with 10% solution of calcium chloride. Slaughtering of animals was performed taking into account the recommendations of the European Committee for the humane treatment of laboratory animals at the 1, 3, 7 and 14 days after introduction of autoexcrement suspension into soft lumbar regions of animal. Pieces of organ were fixed in formalin and glutaraldehyde using a standard method. Coloration of tissue sections was carried out by hematoxylineosin and fuxinmethylene blue.

Our study showed that early stages of sepsis (13 days) were characterized by manifestations of changes in lung tissue as vascular response, having in most cases functional and compensatory character.

In the second period of experimental surgical sepsis on a background of necrotizing fasciitis (the 7th day) changes in the structure of lung tissue beyond the scope of vascular reaction, and were characterized by appearance at first, and subsequently growth of the number of nonobstructive microatelectases which acquired disseminated nature. The third period (the 14th day) was characterized by progression of purulentnecrotic processes in soft tissues, development of surgical sepsis and acute respiratory distress syndrome, which was accompanied by appearance of fluid rich for proteins and fibrin strands in the lumen of the alveoli, as well as alveolocytes exfoliation. The alveolar walls acquired irreversible morphologic character of changes and accompanied by formation of hyaline membranes which are known capable to disrupt oxygen diffusion. Interalveolar septum destroyed, sometimes fibrosis and obliteration of the alveoli developed, foci of abscess formation appeared. These changes were not reversible. Thus, changes revealed in morphological structure of lung tissue allowed determining the number of changes that specific for generalized septic process. This, in turn, confirms that the changes in lung tissue are the consequences of necrotizing fasciitis with its septic complication.

Biography

Hamdamov Sh.A. is an assistant professor of General and Pediatric Surgery Department in Tashkent Medical Academy. He is Fellow of the Faculty of Abdominal Surgery.