KAZAKH NATIONAL AGRARIAN UNIVERSITY

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PATHOGENETIC PECULIARITIES AND PATHOANATOMICAL CHANGES IN BRONCHIAL PNEUMONIA OF CALVES

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INTRODUCTION

- Currently, it revealed a clear tendency to increase the number of patients suffering from diseases of the upper respiratory tract, bronchial tubes and lungs bronchial tube.
- Bronchial pneumonia is registered in different zones of the country, and takes the second place in terms of the ratio after gastrointestinal diseases. As per the data of different authors, 20-30 % of young cattle suffer from bronchial pneumonia every year.
- The occurrence of bronchial pneumonia is caused by low Natural resistance in young animals, and hence reduced resistance of hypopneumatic and atelectatic areas of the lungs due to the small number of ciliary epithelium of the mucous membrane of the airways, which is a favorable environment for the development of potentially pathogenic microflora. Long lying of a weakly developed animal, hyposthenia of cross-striped muscles and smooth muscles of the bronchi cause sudden decrease in ventilation of the lungs with reduction of their respiratory surface and further development of atelectasis and hypostasis where foci of inflammation occur

THE AIMS AND OBJECTIVES OF RESEARCH

The aim of research was to study the incidence and prevalence of pneumonia in young cattle Raiymbek district, Almaty region, its pathogenesis and pathological morphology.

In this connection, the following objectives:

- To examine the incidence and distribution of pneumonia in young animals;
- To study the pathogenesis and functional morphology of the respiratory organs of young animals;
- Develop a comprehensive system of protection of young veterinary;
- To study morphological changes in the bronchopneumonia in young cattle at the organ, tissue, cellular and subcellular levels

MATERIALS AND RESEARCH METHODS

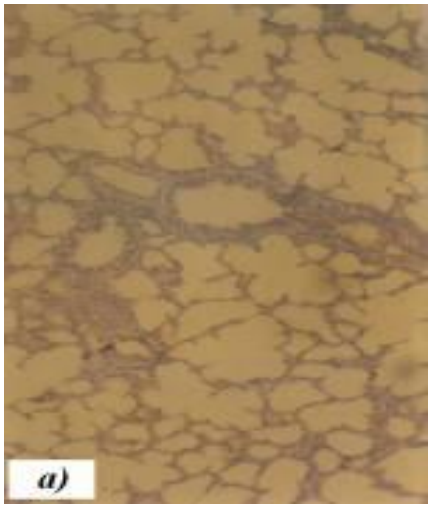
- The experimental part of the work is carried out at the Department of “Clinical Veterinary Medicine” of the Kazakh National Agrarian University and the farms “Aktasty” and “Sholadyr” Raiymbek District with the total number of cattle-144 head.
- In the experimental work were studied the incidence and spread of pneumonia in young cattle in the area; morphological changes in the bronchopneumonia in young cattle at the organ, tissue, cellular and subcellular level. The features of pulmonary surfactant system and the ultrastructural organization alveolocytes I and II types for bronchopneumonia. For the first time in calves described pneumocyte type III. Elucidated pathogenetic mechanisms of development of pneumonia in young cattle.
- The material for histologic and histochemical examination was fixed in 10-12% solution of neutral formaline, Carnoy's fluid. Pieces of lung tissue were frozen over liquid nitrogen for enzyme reactions and research lung surfactant.

- Fixation material for electronic microscope studies were performed in 2.5%-gluteraldehyde on collodion buffer with post fixation in 1%- solution of osmium tetroxide, dehydrated in alcohol, embedded in EPON-812.
- Paraffin sections were stained with hematoxylin-eosin and hematoxylin-pikrofuksin.
- Alveolar surfactant detected in cryostat section of lung Hackney in the modification of rhodamine- J. This qualitive and quantitive assessment of the surfactant was carried out in fluorescent mode microscope MBI-15 and in the microscope "Lomam I-3" under ultraviolet light. The intensity of the luminescence was determined with a microfluorimeter in microvolts, which included the design of a photomultiplier, a power supply, a DC amplifier and a universal voltmeter.
- The volume fractions of tissue structures were determined by point counting. At the same eyepiece used grating, counting was conducted in a 225-node intersections. Counts 3375 units, accounting for the different structures in the lung tissue. The relative proportions determined by the formula: $p = m/n \cdot 100$, where m - the number of units attributable to the studied tissue sections; n - total number of nodes.

RESULTS AND DISCUSSION

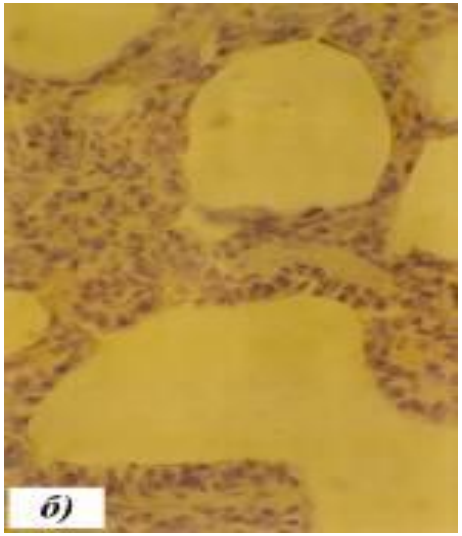
- Results of studies have shown that the structural organization of the respiratory system in clinically healthy calves comply with the species and age parametres, which are known from the available literature.
- Histomorphological examination of the lungs in healthy calves aged 1.5-2 months, the system of airways and parenchyma of the lung tissue was well developed.
- Acini, as structural unit of the lung were clearly expressed(Figure 1a). It was also noted that in light calves no distinct respiratory bronchioles, and was characterized by a rather sharp transition from terminal bronchioles into the alveolar ducts. The thickness of the mucosal epithelium was uniform. In the lumen, bronchioles and alveoli missing any content. They were clean, not sticky(Figure 1b).Integrity interalveolar walls had not been violated.
- It can be traced to the ultrastructural level(Figure 1c). Blood barrier was well formed. Its thickness throughout was approximately the same. In capillaries it noted a moderate amount of red blood cell(Figure 1g). Alveolocytes types I and II maintained a characteristic ultrastructure (Figure 2a, b). In type II alveolocytes clearly identified osmiophil plate calf with an average of 2-3 in each cell(Figure 2b).

The structural organization of the alveoli and bronchioles in the lungs of healthy calves:



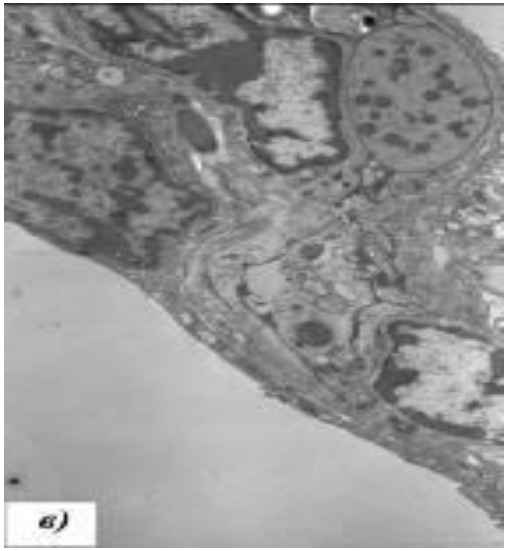
a)the bronchial tubes deep in the lung tissue

The structural organization of the alveoli and bronchioles in the lungs of healthy calves:



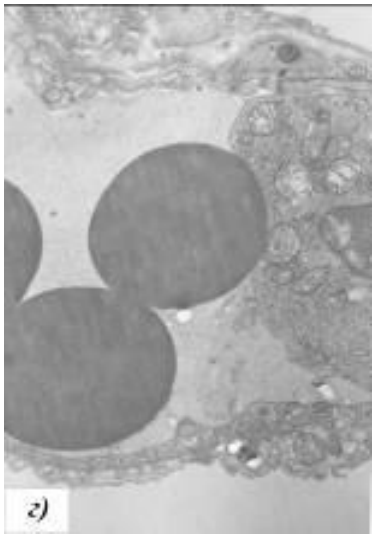
b)the terminal bronchioles

The structural organization of the alveoli and bronchioles in the lungs of healthy calves:



c)Interalveolar partition

The structural organization of the alveoli and bronchioles in the lungs of healthy calves:



d) The air-blood barrier

CONCLUSIONS

- Thus, the results of their own research and analysis of data in the literature suggest that we have identified the cell type can be assigned to alveolocytes type III .
- Histomorphological examination of the lungs of calves in the very early stages of bronchial pneumonia has been found that in addition to serous-catarrhal processes in the upper respiratory tract (rhinitis, laryngitis, tracheitis) primary changes begin to come to light in the end regions of the respiratory tract (bronchial tubes of a different order), peribronchial tissue and in the lung alveoli.
- Moreover, the changes in these structures are developed at the time when the disease is still clinically hardly seen. The main, sometimes the only clinical sign in this stage can only be a serous catarach of the upper respiratory tract. Therefore, this step can be considered as subclinical pneumonia.
- The features of pulmonary surfactant system and the ultrastructural organization alveolocytes I and II types for bronchopneumonia. For the first time in calves describes pneumocyte type III. Elucidated pathogenetic mechanisms of development of pneumonia in young cattle.

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