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MODERN METHODS OF PREVENTION OF PASTEURELLOSIS OF ANIMALS

This review article describes a contagious infectious disease of many domestic and wild animals, pasteurellosis, characterized by an acute course with manifestations of septicemia, lobar inflammation and edema of the lungs, pleura, and in subacute and chronic course – purulent-necrotic pneumonia, arthritis, mastitis, keratoconjunctivitis, endometritis and sometimes enteritis. Modern methods of prevention and diagnosis of the disease are described. Diagnosis of pathology is carried out mainly by bacteriological methods, serological methods are used as auxiliary ones. Treatment of pasteurellosis includes etiotropic antibiotic therapy, detoxification, antipyretic and other symptomatic agents.

The combination of preventive measures allows farmers to maintain the health of economically significant animals at the proper level. This process is based on close cooperation and dialogue between farmers and veterinarians. The disease of young animals in many cases can lead to death in the absence of symptomatic treatment. Therefore, prevention measures are very important than the fight against an already existing disease.

Keywords: pasteurellosis, disease, prevention, animals, treatment, diagnostics.

Introduction

Pasteurellosis is an acute infectious disease of many types of domestic and wild animals, which is characterized by fever, intoxication, pneumonia, pleurisy, inflammation of the skin, subcutaneous tissue, arthritis, osteomyelitis, endometritis, mastitis. Animal pasteurellosis is also dangerous for humans.

The causative agents of the disease are bacteria belonging to the genus Pasteurella, the species *Pasteurella multocida* and *Pasteurella haemolytica.* In

the environment, pasteurella is able to maintain its vital activity for a relatively short time. In cold water, manure, blood can be preserved for up to three weeks, in the tissues of dead animals for up to four months, in meat subjected to deep freezing for up to a year. The incubation period in animals lasts from 3–4 hours to 2 weeks. In 40 % of cases, sick animals die [1].

Materials and methods

The pathways of transmission of the causative agent of the disease are diverse. The first and most dangerous is airborne. The second is when in contact with sick animals, when bitten, as well as after scratches inflicted when handling cats. It can be transmitted through food and water contaminated with animal feces, as well as by the bite of horseflies. In an animal, the infection may be asymptomatic, but at the same time infect others. The figure 1 shows strains of bacteria.

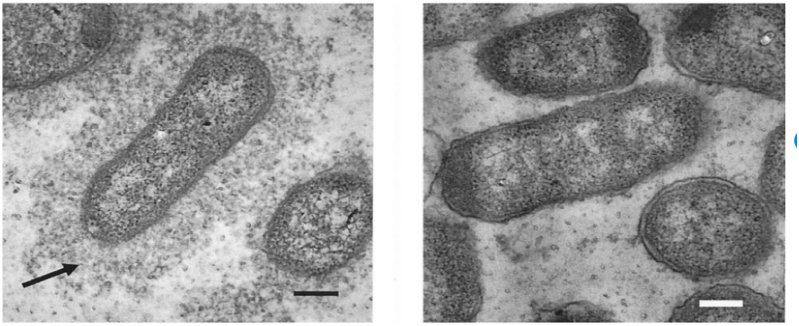

Figure 1 – Electron micrographs of *P. multocida* strains

All kinds of domestic mammals and birds are susceptible to pasteurellosis. Buffaloes, cattle, rabbits and chickens are the most sensitive. Relatively high resistance to pasteurellosis in horses and carnivores. Pasteurellosis manifests itself in the form of sporadic cases, but under conditions conducive to its spread, it can acquire the character of an epizootic [2].

The main source of the causative agent of infection are sick and ill animals, as well as clinically healthy animals that were in close contact with patients with pasteurellosis. Pasteurization is of great importance in the epizootology of the disease, which reaches 70 % among cattle, 50 % among sheep, 45 % among pigs, more than 50 % among rabbits and 35 to 50 % among chickens in dysfunctional farms, in shown in the figure 2.

Factors contributing to the epizootic spread of pasteurellosis include mass movements of animals for one reason or another without due consideration of the degree of well-being of pasteurellosis farms, the lack of proper organization of

economic and veterinary-sanitary measures in livestock and poultry farms, the widespread use of insufficiently neutralized slaughterhouse waste as feed [3].

The ways of isolating pathogens from an infected organism are different: with feces, urine, especially with nasal discharge when coughing, snorting, with blood when bleeding. Sick cows can secrete pasteurels also with milk.

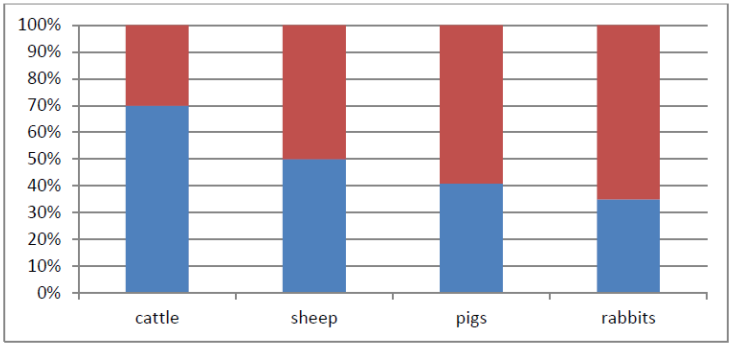

Figure 2 – The significance of epizootics of the disease in different animals

The pathogen is transmitted through direct contact (joint maintenance of healthy and sick animals), as well as through infected feed, water, soil, care items, milk, meat processing industry waste, mouse-like rodents, insects, wild birds and humans [4].

Infection of animals is possible through the respiratory organs (aerogenic pathway), injured skin and mucous membranes.

Morbidity and mortality in pasteurellosis can vary greatly depending on the virulence of the pathogen, the immunological structure of the herd, conditions of maintenance and feeding, the presence of concomitant infections and the timeliness of health measures. In modern conditions of animal husbandry, pasteurellosis can occur simultaneously with other diseases: *parainfluenza, infectious rhinotracheitis, adenovirus infection, salmonellosis, streptococcosis, diplococcosis;* in pigs – with erysipelas, plague, salmonellosis; in chickens – with *escherichiosis* and *staphylococcosis*. Mixed infections are usually more prolonged and malignant.

Pasteurellosis of animals is observed at any time of the year, in pigs more often in March-April and September-November, in cattle in July-August and September-November.

Depending on the virulent properties and pathways of the pathogen, the incubation period in pasteurellosis lasts from several hours to 3 days. The disease can occur hyperacute, acute, subacute and chronically.

In cattle with an ultra-acute course, the body temperature suddenly rises to 41 °C, severe cardiac disorders appear, sometimes bloody diarrhea. The animal dies after a few hours with symptoms of rapidly increasing heart weakness and pulmonary edema [5].

Acute pasteurellosis, as a rule, proceeds with a predominant lesion of either the intestine (intestinal form), or respiratory organs (thoracic form), or the appearance of edema in various parts of the body (edematous form). Body temperature in all forms of acute pasteurellosis is elevated.

The intestinal form is more often manifested in young animals and is characterized by progressive diarrhea and weakness of animals. Often, blood appears in the feces. Animals are thirsty, anemia of the mucous membranes is progressing, depression is increasing.

In the thoracic form, signs of acute fibrinous pleuropneumonia are noted: accelerated and labored breathing, cough, discharge from the nasal openings, serous at the beginning, and then serous, the pulse is rapid. During auscultation of the chest, areas of dullness, increased bronchial breathing, and sometimes friction noises are heard. By the end of the disease, diarrhea with an admixture of blood often develops. The disease lasts for several days. Many sick animals die, or the disease takes a subacute or chronic course [6].

Results and discussion

The diagnosis of pasteurellosis is established on the basis of a complex of epizootological, clinical, pathological and laboratory studies.

Blood from superficial vessels and nasal mucus are taken from sick animals as the test material, and after death or forced slaughter – blood from the heart, lymph nodes (mesenteric, pharyngeal, mediastinal, supravyminal, etc.), pieces of lungs, liver, spleen, heart, kidney, tubular bone. In the summer (during long-term transportation), the pathological material is preserved with a 30 % sterile glycerin solution [7].

Laboratory diagnostics of pasteurellosis provides:

1) microscopy of blood smears and smear prints from affected organs;

2) isolation of pure culture on nutrient media with identification by biochemical properties;

3) isolation of pasteurella by infecting laboratory animals (white mice or rabbits) with a suspension of pathological material and culture from the nutrient medium;

4) determination of the virulence of isolated cultures for white mice and rabbits;

5) determining the serovariant affiliation of pasteurels.

The diagnosis of pasteurellosis caused by *R. multocida* is considered established:

1) when virulent pasteurella is isolated from the blood or simultaneously from several parenchymal organs;

2) isolation of culture only from the lungs of cattle or pigs;

3) in sheep - simultaneous isolation from the lungs, blood and parenchymal organs of A. *haemolytica* is the basis for the diagnosis of hemolytic pasteurellosis.

The isolation from the lungs of simultaneously weakly virulent *R. multocida* and *A. haemolytica* indicates a mixed disease of pasteurellosis caused by pasteurella of both species. Such pasteurellosis is diagnosed as pasteurellosis pneumonia.

To prevent the disease, managers and specialists of farms, animal owners must ensure the following measures: quarantine all animals entering the farm for 30 days under veterinary control and, if indicated, vaccinate against pasteurellosis; complete the herd with animals only from farms that are safe for pasteurellosis; prevent contact of farm animals with animals that are in personal use; have sanitary permits on farms and provide maintenance personnel with replaceable clothes and shoes; to protect animals from various stressful influences; to carry out systematic vaccination of animals in areas unfavorable for pasteurellosis; farms in which pasteurellosis was registered, to complete only vaccinated livestock for 1 year [8].

Sick animals are injected with hyperimmune serum against pasteurellosis in a therapeutic dose and one of the antibiotics (terramycin, oxytetracycline, biomycin, chlortetracycline, tetracycline, streptomycin, levomycetin), prolonged-acting drugs or more modern drugs – enrofloxacin, etc. Pathogenetic and symptomatic agents can be used for therapeutic purposes [9].

When the disease of animals with pasteurellosis is established, the farm is declared dysfunctional for pasteurellosis, restrictions are imposed and a plan of organizational, economic To prevent the disease, managers and specialists of farms, animal owners must ensure the following measures: quarantine all animals entering the farm for 30 days under veterinary control and, if indicated, vaccinate against pasteurellosis; complete the herd with animals only from farms that are safe for pasteurellosis; prevent contact of farm animals with animals that are in personal use; have sanitary permits on farms and provide maintenance personnel with replaceable clothes and shoes; to protect animals from various stressful influences; to carry out systematic vaccination of animals in areas unfavorable for pasteurellosis; farms in which pasteurellosis was registered, to complete only vaccinated livestock for 1 year.

Conclusions

From all of the above, we can conclude in order to localize the epizootic focus and eliminate the disease, farm managers and veterinary specialists should ensure that the following measures are carried out:

1) clinical examination and thermometry of all animals of the disadvantaged group;

2) isolation of patients and suspected of the disease in a separate room and securing them with special equipment and sanitary and hygienic means and service personnel.

3) clinically healthy farm animals, regardless of their location, should be immunized against pasteurellosis with one of the vaccines.

The current disinfection is carried out in the room where the animals are kept, immediately upon the appearance of the first cases of illness or death, and then daily during the morning cleaning of the premises where the sick and suspected animals are located [10].

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ЖАНУАРЛАРДЫҢ ПАСТЕРЕЛЛЕЗІН АЛДЫН-АЛУДЫҢ ЗАМАНАУИ ӘДІСТЕРІ

Мақалада көптеген үй және жабайы жануарлардың жұқпалы ауруы пастереллез сипатталған. Септицемия, бірлескен қабыну және өкпе ісінуі, плевра, субакутты және созылмалы ағыммен іріңді-некротикалық пневмония, артрит, мастит, кератоконьюнктивит, эндометрит және кейде энтеритпен сипатталады. Аурудың алдын-алу және диагностикалаудың заманауи әдістері сипатталған. Патологияны диагностикалау негізінен бактериологиялық әдістермен жүзеге асырылады, серологиялық әдістер көмекші ретінде қолданылады. Пастереллезді емдеуге этиотропты антибиотикалық терапия, детоксикация, антипиретикалық және басқа симптоматикалық агенттер кіреді.

Алдын алу шараларының үйлесімі фермерлерге экономикалық маңызы бар жануарлардың денсаулығын тиісті деңгейде ұстауға мүмкіндік береді. Бұл процесс фермерлер мен ветеринарлар арасындағы тығыз ынтымақтастық пен диалогқа негізделген. Ветеринардың үнемі тексеруі және тамақтануды, ұстау жағдайларын және фермадағы гигиеналық жағдайды мұқият бақылау өзара әрекеттесудің негізін құрайды және аурудың дамуына дейін уақтылы көмек көрсетуге мүмкіндік береді. Жас жануарлардың ауруы көптеген жағдайларда симптоматикалық ем болмаған кезде өлімге әкелуі мүмкін. Сондықтан алдын-алу шаралары бар аурумен күресуден қарағанда өте маңызды.

Кілтті сөздер: пастереллез, профилактика, жануарлар, емдеу, диагноз.

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СОВРЕМЕННЫЕ МЕТОДЫ ПРОФИЛАКТИКИ ПАСТЕРЕЛЛЕЗА ЖИВОТНЫХ

В статье описано заразное инфекционное заболевание многих домашних и диких животных пастереллез, характеризующееся острым течением с проявлениями септицемии, долевым воспалением и отеком легких, плевры, а при подостром и хроническом течении – гнойно-некротической пневмонией, артритом, маститом, кератоконъюнктивит, эндометрит и иногда энтерит. Описаны современные методы профилактики и диагностики заболевания. Диагностику патологии проводят в основном бактериологическими методами, в качестве вспомогательных используют серологические методы. Лечение пастереллеза включает этиотропную антибиотикотерапию, дезинтоксикационную, жаропонижающую и другие симптоматические средства.

Сочетание профилактических мер позволяет фермерам поддерживать здоровье экономически значимых животных на должном уровне. Этот процесс основан на тесном сотрудничестве и диалоге между фермерами и ветеринарами. Регулярный осмотр ветеринаром и тщательный контроль за питанием, условиями содержания и гигиеническим состоянием на ферме формируют основу взаимодействия и дают возможность оказать своевременную помощь еще до развития того или иного заболевания. Заболевание молодняка во многих случаях может привести к гибели при отсутствии симптоматического лечения. Поэтому меры профилактики очень важны, чем борьба с уже имеющимся заболеванием.

Ключевые слова: пастереллез, профилактика, лечение, диагностика.

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