










On Preventive Measures Necessary to Prevent Anthrax

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Abstract. This article presents information on the need for preventive measures in natural and hazardous areas to prevent the spread of anthrax among animals and humans. The disease occurs worldwide, and there is a risk of its occurrence in our republic. Therefore, consistent and systematic anti-anthrax measures are essential for disease prevention. Since anthrax can be transmitted not only through animal products but also from nature to humans and animals, implementing preventive measures against anthrax is not the final conclusion of ongoing disease prevention efforts. Therefore, a brief overview of measures that are essential for implementing measures to combat this disease is provided.

Keywords: anthrax, infection, bacillus, spore, vaccination, prevention, medicine, veterinary medicine, obligate, enzootics, epizootics, epidemic

1 Introduction

We know that anthrax is one of the most dangerous diseases for humans and animals, therefore, along with the development of science, many scientists in the field of veterinary medicine and medicine have been working on the problem of anthrax and have conducted a lot of research on the occurrence, spread, level of infectiousness, methods of protection against it, and prevention of the disease, and have achieved various positive results [1,7,11]. Based on these conclusions, all the problems of the disease have been solved and are being implemented in practice, and it seems as if all the problems have been solved. However, even today, there are still quite relevant and in-depth research problems on this disease. The risk of anthrax outbreaks is present all over the world. Epizootics of the disease are recorded in many countries of the world [7, 11]. The fact that the disease is fatal due to the parasitoid habitat of the pathogen and that the disease ends mainly in the death of animals during epizootic outbreaks is one of the main features of anthrax. The susceptibility of animals to infection in natural

conditions is a prerequisite for the disease. The literature indicates that various types of animals are infected with the disease, and our own studies have also identified similar cases of infection among various types of animals. It has been shown that the ability of the pathogen to enter the body and because disease depends not only on the amount or location of the anthrax microbe, but also on the type of animal. On this basis, 19 species of animals have been identified as being affected, of which large cattle are the most affected, while sheep, goats, horses, pigs, and many wild herbivores are considered to be the largest parasitoid system, among which deer, antelope, bison, hippopotamus, and even elephants, as well as wild ruminants and carnivores, are also affected. This situation, as a result of the influence of endemic animals, leads to the emergence of natural stationary (soil) foci and leads to constant recontamination of the soil. Such cases are most often observed in areas where animals roam freely, i.e. in Africa, Asia, and Australia. Diseases of wild herbivores are observed more often in Africa and the southern part of the USA, bison in Canada, and deer in western Russia. Infections of horses and carnivores are sporadic, have the character of entering the open air, are mainly recorded in rare cases, and do not develop into an anthrax epidemic or zoonotic disease.

2 Materials and methods

Etiology of anthrax: The causative agent of the disease, *Bacillus anthracis*, is a gram-negative, spore-forming rod-shaped bacterium with a length of 3-10 μm and a width of 1-1.5 μm . It is a spore-forming bacterium that is very resistant to external influences after exposure to oxygen. In oxygen conditions, it is resistant to high temperatures, drying and simple disinfectants, and can survive in the soil for 80-100 or more years [2,3,6]. It also has the property of multiplying if there are favorable conditions in the soil.



Figure 1. Appearance of the pathogen under a microscope

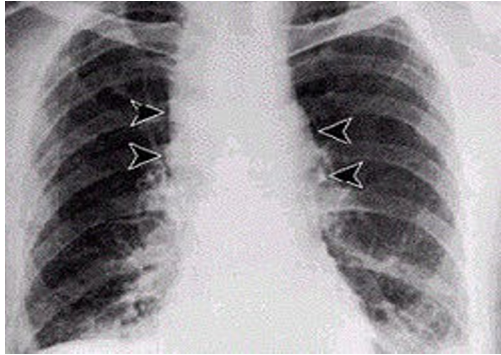


Figure 3. X-ray appearance of pulmonary anthrax disease in man



Figure 4. Purulent-septic appearance of tissues in the cutaneous form of anthrax

The source of the disease is sick animals. Infection can be transmitted through the alimentary (feed and water) route, less often through damaged skin, mucous membranes or transmissive, that is, through blood-sucking insects.

The disease can occur rapidly, in acute, subacute and chronic forms. In the acute course, the animal can die suddenly without any clinical signs, while in the acute course (41-42°C) it is accompanied by fever, loss of appetite, swelling in the throat and chest, and the main characteristic symptom is the discharge of bloody fluid from natural openings.

3 Results

Diagnostics - anthrax diagnosis is a complex approach, based on epizootic data, clinical signs and laboratory tests. Slaughter of animals infected with anthrax is strictly prohibited, and if the animal has died, its carcass is dissected. For laboratory testing, the ear of the dead animal (except pigs) that touches the ground is cut off or a sample of connective tissue from the swollen part of the body or (in pigs) the inguinal lymph node is taken and sent for examination.

Prevention. First of all, taking into account the epizootic situation in the region, it is recommended to systematically vaccinate all agricultural and domestic animals with a

vaccine prepared from a special VNIIVViM-55 strain. If the disease occurs in the region, it is recommended to carry out mandatory revaccination of all healthy animals. In order to prevent enzootic, sporadic and epizootic situations, it is necessary to constantly monitor the epizootic areas with a risk of disease outbreaks.

Special studies - we are carrying out measures to create a cadastre and cartography of disease foci in order to ensure epizootic stability in the Republic and to constantly monitor the geographical location of areas considered stationary unhealthy in areas where anthrax occurred in an enzootic or epizootic state several decades ago. These measures are being carried out in cooperation with the Republican Committee for the Development of Veterinary Medicine and Livestock Breeding on the basis of constant monitoring on the ground.

When dealing with the problem of anthrax, it is necessary to have knowledge about the ecology of the pathogen, as well as the influence of the external environment on the pathogen, and the specific epizootic characteristics of the spread of the disease. The problem of the disease was addressed in the former Soviet republics in Russia (1963 E.N. Shlyakhov, 1968 A.V. Andronikov, 1971 K.S. Danilova, 1979 A.I. Zavirukha), Uzbekistan (1975 D.A. Adilov, D.S. Saifutdinov, P.I. Chechenin), Western Siberia (1971 S.I. Dzhupina and I.Ya. Kogan), Buryatia (1971 I.L. Naimanov), while in Uzbekistan in 2003-2005 B.S. Saitkulov, H.S. Salimov, G.A. Mengliev, A.S. Mengliev, 2010-2020 B.T. Norqobilov, G.A. Mengliev, I.H. Salimov, and H.S. Salimov studied the specific features of the epizootology of anthrax [1,9,10].

4 Conclusion

The specific preventive measures taken will prevent the infection of animals with the causative agent of the disease. This, in turn, will include constant monitoring of the presence of anthrax spores in the soil and the development of measures to eliminate them. It is necessary to conduct constant monitoring of stationary unhealthy foci and detailed monitoring and analysis of epizootic foci, paying special attention to their territorial distribution and specific characteristics [8,11].

If we examine the above-mentioned situations in more depth, we still need to carry out extensive practical and scientific research work by practicing veterinarians, medical professionals, and researchers in order to adequately address the problems of eliminating and preventing this disease.

Disclosure of Interests. The authors have no competing interests to declare that are relevant to the content of this article.

References

1. Adilov D.A., Sayfutdinov D.S., Chichenin P.I. Atlas statsionarno neblagopoluchnyx po sibirskoy yazve punktov v Uzbekskoy SSR. - Tashkent, "Uzbekistan", 1979. - 412s.

2. Beklemishev, V.N. *Parasitism of Arthropods on Terrestrial Vertebrates*. Medical Parasitology and Parasitic Diseases, 1951, Vol. 20, Issue 2, pp. 151–160.
3. Balashov, Yu.S. *Blood-Sucking Ticks (Ixodoidea) — Vectors of Animal and Human Diseases*. Moscow: Nauka, 1967. – 339 p.
4. Kuklina, T.E. *Fauna of Ixodid Ticks of Uzbekistan*. Tashkent: Fan, 1976. – 127 p.
5. Uzakov, U.Ya. *Ixodid Ticks of Uzbekistan*. Tashkent: Fan, 1972. – 304 p.
6. Zablotsky, V.T. *Babesiosis (Piroplasmosis) of Cattle. Part 1*. Russian Veterinary Journal. Agricultural Animals, 2012, No. 1, pp. 43–44
7. Djupina S. I. Comparative epizootology of Siberian yazvy. // J. "Veterinary", No. 9, 1999, pp. 13-17.
8. Jalilov K.J., Sayitkulov B.S. Zoonotic diseases. -Tashkent, Ibn Sina publishing house, 1995. - P.223.
9. Menliev G'., Salimov H.S. Anthrax foci in the north-western regions of Uzbekistan activity. //Zooveterinary. - Tashkent, 2009. - No. 8-9 p.
10. Mengliev G. Epizootological analysis of foci of anthrax in the northern regions of Uzbekistan. //Zooveterinary. - Tashkent, 2009. - No. 7. - pp. 14-15.
11. Yamtitina M.N., Makarov V.V. Anthrax Global Epizootology. Susceptible Animals. *Veterinary Science Today*.2018;(4):4952. <https://doi.org/10.29326/2304-196X-2018-4-27-49-52>.

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