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Study Of The Current Epizootic And Epidemiological Situation Of Anthrax In The Republic Of Uzbekistan

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Abstract. This article presents the results of an analysis of the epizootic and epidemiological situation of anthrax in the Republic of Uzbekistan. It was noted that the dynamics of human anthrax incidence in the country, in percentage terms, directly correlates with that of animals, although the absolute number of infected animals was on average higher than that of infected humans. This indicates a direct dependence of human morbidity on the spread of infection among animals. Based on the conducted analysis, groups of regions with the highest epizootic and epidemiological potential were identified.

Keywords: Epizootology, epidemiology, anthrax, anthrax-affected areas.

Anthrax is an acute, highly dangerous saprozoonotic infection that retains socio-economic significance due to its wide geographical distribution, the persistence of soil foci, the severity of the disease, and the considerable economic losses it causes [1, 2, 3, 4, 5, 7, 8, 10]. At the same time, despite the timely implementation of anti-epidemic measures, anthrax outbreaks are still observed in almost all countries around the world [3, 4, 6, 11, 16]. Cases of anthrax are reported annually not only among animals but also among humans, including fatal cases [2,4,6,11,15]. Due to the livestock-oriented economy of the Central Asian republics, anthrax has become widely spread throughout their territories [1,11,15,16]. At the present stage, anthrax continues to pose a serious problem for public health and agriculture in the Republic of Uzbekistan. In our country, which is characterized by a well-developed livestock sector and the presence of permanently anthrax-affected areas (PAA), the epidemic potential of this infection remains quite high, creating a risk of both epidemic and epizootic outbreaks. In this regard, a detailed analysis of the epizootic and epidemiological situation of anthrax is required, including the study of the territorial distribution of permanently anthrax-affected areas (PAA) and the regional characteristics of the disease over a multi-year period. It should be noted that identifying and documenting PAAs, including determining their geographic coordinates, is essential not only for their official registration but also for the targeted implementation of anthrax prevention measures at the regional level.

The aim of the study is to investigate the current epizootic and epidemiological situation of anthrax in the territory of the Republic of Uzbekistan.

Materials and Methods: To assess the epidemiological situation in the republic, data from the official statistical registration of anthrax cases, as well as from the Republican Department of Sanitary and Epidemiological Welfare and Public Health for the years 2012–2022, were used. The analysis of anthrax morbidity in animals was conducted based on statistical reports from the Veterinary Department of the Ministry of Agriculture and Water Resources of the Republic of Uzbekistan. Characteristics of the epizootic situation were based on data from the Republican Veterinary Department regarding the density of permanently anthrax-affected areas (PAA) per 100

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km², the dynamics of their formation, and the seasonality of disease occurrence. To differentiate territories by the degree of risk of anthrax infection, an epizootic index was calculated. When studying the influence of natural and climatic factors on the nature of the epizootic process (territorial distribution, seasonality, routes of spread), long-term average data from agrochemical and hydrometeorological services on soil quality, temperature indicators, and precipitation were used.

Results and Discussion: The spread of anthrax in Uzbekistan was primarily facilitated by natural and climatic conditions, the large populations of sheep (small ruminants), cattle (large ruminants), and horses, as well as the nomadic nature of livestock farming. The reservoir of Bacillus anthracis is highly resilient, and soil foci can persist for an indefinite period, serving as a source of infection for both domestic and wild ungulates. During the period from 2012 to 2022, a total of 282 people were infected with anthrax in the republic. The most unfavorable years were 2019, 2020, 2021, and 2022, with incidence rates ranging from 0.07 to 0.4 per 100,000 population. The highest number of human cases was registered in Tashkent region (90 cases), the city of Tashkent (58 cases), Kashkadarya region (48 cases), Syrdarya region (28 cases), and Samarkand region (22 cases). Out of 993 heads of livestock that died from anthrax in the Republic of Uzbekistan, the largest numbers were recorded in Tashkent region (212 heads), Syrdarya region (202 heads), Jizzakh region (86 heads), and Samarkand region (85 heads). The peak incidence in both humans and animals occurred during 2019-2022, accounting for 70.9% and 69.7%, respectively. It was noted that the dynamics of anthrax incidence in humans in the republic, expressed as a percentage, directly correlate with those in animals, although the absolute number of infected animals was on average higher than that of infected humans. This indicates a direct dependence of human morbidity on the spread of infection among animals. Most often, human infection occurred through contact with infected animals during slaughtering, carcass processing, skinning, and meat handling. Notably, the largest outbreaks of infection among humans were associated with a relatively small number of infected animals (1 - 4 heads). Overall, more sheep (51.7%) than cattle (45.4%) died in the republic, with horses accounting for 0.7%. During the study period (2012-2022), 27 permanently anthrax-affected areas were recorded within the territory of the republic. To account for the dynamics of the emergence of affected areas and the manifestation of their activity in subsequent years, we based our analysis on ten-year periods, which allows for a more reliable identification of rises and declines in the intensity of the epizootic and epidemiological process of anthrax.

The first period, 2014–2017, characterized by high incidence of anthrax in humans and animals in the republic, differs from other periods by the emergence of the maximum number of new anthrax-affected areas [8], permanently active areas [10], and recurrent areas [7], according to the classification by B.L. Cherkassky [12]. The more frequent occurrence of anthrax during this period was also facilitated by large-scale earthworks, reclamation and irrigation systems and canals, recreational facilities, and industrial enterprises, which covered tens of thousands of hectares of agricultural land across many regions of the republic. The detection of new anthrax-affected areas sharply decreased over the 10-year period, with only 7 new areas registered. However, the known areas continued to maintain high activity (11 recurrent areas), and 8 areas transitioned into the category of manifest areas. In recent years, 2019–2022, almost all permanently anthrax-affected areas [19] became manifest, 8 were recurrent, and only 2 were new areas. The study of disease

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seasonality began with determining the seasonal prevalence of infection among animals. To this end, an analysis was conducted on the timing of the initial registration of anthrax cases among animals in 130 permanently anthrax-affected areas (PAA). The analysis showed that anthrax in animals was recorded almost year-round in the republic. Anthrax-affected areas were most frequently registered during the summer months - 42.3%, with a peak in August at 23.8%. A significant number of animal cases in affected areas were also identified during the autumn period - 28.5%, half of which occurred in October (14.6%). In the spring months, 19.2% of affected areas were registered, with the majority detected in March (11.5%). The early spring increase in the epizootic wave is likely caused by sudden thaws (up to 20–22°C and above), accompanied by snow melt and the release of unvaccinated livestock to the pastures. The lowest proportion of affected areas was recorded during the winter period - 10%. It is known that the activity of the epizootic process in permanently anthrax-affected areas is associated with soil and climatic conditions that influence the biology of the pathogen [5]. The anthrax pathogen persists longest in humus-rich soils with alkaline or neutral pH and significant moisture [9,13]. As a result of the analysis, three groups of regions were identified based on their epizootic and epidemiological potential relative to the average indicator: 1) regions with low epizootic-epidemiological potential - indicators up to 10; 2) regions with moderate epizootic-epidemiological potential – 11-20; 3) regions with high epizootic-epidemiological potential - above 40. Considering the high prevalence and intensity of the epizootic-epidemiological situation, regions in the third group can be classified as areas of anthrax endemicity (stationarity), whereas the rest of the republic's territory can be considered a zone of sporadic infection occurrence.

Thus, the summary of the data on the number and territorial distribution of permanently anthrax-affected areas (PAA), the degree of their activity in retrospect, and the current trends toward increased activity indicate that regions with high epizootic and epidemiological potential have not only established a status of high anthrax risk in Uzbekistan but have also significantly influenced the anthrax situation throughout the entire Central Asian region.

References:

1. State Program for Forecasting and Preventing Emergencies. Program for the Prevention of Epidemics, Epizootics, and Epiphytotics in the Territory of the Republic of Uzbekistan. 2011.
2. Infectious Diseases: National Guide. Edited by N.D. Yushchuk. Moscow: GEOTAR-Media; 2010:396-406.
3. Guide to Epidemiology and Infectious Diseases in 2 Volumes. Briko N.I., Onishchenko G.G., Pokrovsky V.I. 2018; 17(6):18.
4. Kolomycev S.A. Epizootic Situation on Especially Dangerous Animal Diseases in the Russian Federation for 2011. Veterinary Life. 2012; No. 5, p. 5.
5. Marinin L.I., Dyatlov I.A., Shishkova N.A., Gerasimov V.N. Anthrax Animal Burial Sites: Problems and Solutions. Moscow: Dynasty; 2017.
6. Cherkassky B.L., Ivanova A.A. Epidemiological situation of zoonoses in Russia. Journal of Epidemiology and Infectious Diseases. 1996; No. 2:12-15.

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7. Abuova G.N. The state of morbidity of zoonotic infections in the South Kazakhstan region at the present stage. Central Asian Scientific and Practical Journal of Public Health. 2011; No. 4:36-40.
8. Ananyina Y.V. Natural focal bacterial zoonoses: current trends in epidemic manifestation. Microbiology Journal. 2002; No. 6:86-90.
9. Sayapina L.V., Lobach R.N., Bondarev V.P., Nikityuk N.F. Current state of anthrax diagnosis: detection and identification of Bacillus anthracis. Biopreparations: Prevention, Diagnosis, Treatment. 2016; Vol. 16, No. 1:27-34.
10. Zholdoshov S.T., Toichuev R.M., Mamytova M.M. Characteristics of the socio-economic significance and ranking of the territory of the southern region of the Kyrgyz Republic by anthrax. Fundamental Research. 2015; No. 1:1349-1353.
11. Simonova E.G., Loktionova M.N., Kartavaya S.A., Raichich S.R. Anthrax in the Russian Federation: improving epizootic and epidemiological surveillance at the present stage. Epidemiology and Vaccine Prophylaxis. 2018; No. 2(99):57-62.
12. Experience of using GIS technologies to study the patterns of spatiotemporal distribution of permanently anthrax-affected areas / B.L. Cherkassky et al. Epidemiology and Infectious Diseases. 2005; No. 6:19-23.
13. Lukhnova L.Yu. Modern epidemiological surveillance of anthrax in the Republic of Kazakhstan: Author's abstract of doctoral dissertation in medical sciences / L.Yu. Lukhnova. Almaty, 2008. 71 p.
14. Anthrax in the Republic of Dagestan / A.N. Kulichenko et al. Problems of Especially Dangerous Infections. 2013; No. 2:22-25.
15. Abakarimov S.T., Baatyrbekov E.Sh., Shevchenko V.P. On the morbidity status and preventive measures of anthrax in the Kyrgyz Republic. Materials of the Interregional WHO/FAO Working Meeting on Anthrax. Almaty, 1997; pp. 26-27.