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CLINICAL AND EPIDEMIOLOGICAL ASSESSMENT OF ANTHRAX

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КЛИНИКО-ЭПИДЕМИОЛОГИЧЕСКАЯ ОЦЕНКА ЗАБОЛЕВАЕМОСТИ СИБИРСКОЙ ЯЗВОЙ

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Abstract. The article presents the results of epidemiological, clinical analysis of the registered incidence of anthrax for the period from 2015 to 2020 in Osh, Jalal-Abad region of the Kyrgyz Republic. There is a pronounced tendency to increase the incidence of anthrax with a wide spread in disadvantaged inpatient facilities.

Аннотация. В статье представлены результаты эпидемиологического анализа регистрируемой заболеваемости сибирской язвы на Юге Кыргызстана за 5-летний период. Показана выраженная тенденция к повышению заболеваемости сибирской язвой с широким распространением в неблагополучных стационарных пунктах сибиреязвенных очагов.

Keywords: anthrax, soil foci, epidemiology, clinical course.

Ключевые слова: сибирская язва, почвенные очаги, эпидемиология, эпизоотология.

Relevance of the problem: Despite the successes achieved in studying the problem of Bac. anthracis, it continues to be registered in many countries of the world and remains relevant for healthcare and veterinary medicine. The causative agent of anthrax is able to persist for a long time, spore formation, multiply and thereby take root in the soil and leads to the formation of persistent soil foci of infection. The relevance is due to the high incidence of people with anthrax, the wide spread of anthrax foci. Violation of the current veterinary and sanitary rules in animal husbandry has led to epidemiological problems. Therefore, a detailed analysis of the epidemiological situation of the principles of diagnosis and recommendations for the treatment of anthrax, regularly published in leading medical journals, may be of interest to the medical community [1]. The peculiarity of the modern epidemiological situation both around the world and in Kyrgyzstan and the CIS is the widespread activation of almost all known infectious diseases, including those that were considered studied and have traditionally been and are under the close control of sanitary and epidemiological services. The greatest danger in epidemiological terms is primarily particularly dangerous and dangerous infections, mainly related to quarantine and natural focal diseases, such as anthrax. The modern evolution of anthrax, expressed in a significant change in their main epidemiological features, was the result of the following processes: the formation of anthropurgical foci of B. anthracis; a change in the boundaries of the structure of their nosoareals; a change in the

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composition of epidemiologically significant sources of infectious agents; the introduction of B. anthracis into territories previously free of them; a change in the structure of circulating strains of pathogens; an increase in their variability and adaptive abilities under the influence of natural and anthropogenic factors, etc. Proven, widespread variability of pathogens of particularly dangerous zoonoses, isolation of anthrax microbes in natural foci, migration to atypical hosts and other phenomena make it difficult to timely identify pathogens and diagnose diseases caused by B. anthracis [2]. *The purpose* of this study was to study the incidence of anthrax in the south of Kyrgyzstan, the features of the course of the cutaneous form of anthrax.

Materials and research

Materials of registration of cases of anthrax in the south of Kyrgyzstan were used in the work. Morbidity rates are expressed per 100,000 population. The material for studying the prevalence of anthrax was the data on the registered incidence of the Republican Center for Quarantine and Especially Dangerous Infections, the materials of the study were also retrospective data, epidemiological maps of the examination of foci, registers of registration of infectious diseases (form 60/y). The work used a comprehensive epidemiological research method, including the study of long-term dynamics and structure of the incidence of anthrax. An epidemiological assessment of the monthly incidence in general, as well as in various age groups of the population, was carried out. The age structure and seasonality have been studied [4].

The incidence analysis was carried out from 2015-2020. An analysis of the clinical manifestations of the cutaneous form of anthrax was carried out based on the observation of 109 patients with this nosology aged 7 to 70 years who were hospitalized in the south of Kyrgyzstan from 2015-2020 [5].

During clinical examination and assessment of the severity of the condition of patients, generally accepted criteria were used and special attention was paid to the nature of the severity of the main symptom complexes of the cutaneous anthrax: the duration of fever, the presence of edema, the size of the ulcer, serous discharge, the duration of the scab, the duration of lymphadenitis. All patients underwent decoding of the leukocyte formula of peripheral blood.

The diagnosis of cutaneous anthrax was confirmed by bacteriological (by isolating the culture of the pathogen from the patient from the affected areas of primary affects) and clinical and epidemiological data [2].

All patients underwent antibiotic therapy in accordance with Order No. 1 of the Ministry of Health of the Kyrgyz Republic dated January 2, 2001 "On measures to reduce the incidence of anthrax in the Republic" (http://www.stat.kg/ru/).

Results and its discussion

An analysis of the incidence of anthrax in the south of Kyrgyzstan over 5 years showed that there was a steady upward trend in registered incidence, there were periodic rises in 2015, 2018, 2020. The southern region remains unfavorable in terms of the spread of anthrax in recent years, where cases of this skin disease among people are recorded annually. Our analysis of 109 patients with cutaneous anthrax showed that, regardless of the epidemiological situation, people of active age from 15 to 50 years old, children of the older age group from 8 to 15 years old, and persons of mature age from 51 to 60 years old are most often ill. predominance of males. This is explained by the fact that people of these age groups, due to a more active lifestyle, are more at risk of infection. The source of infection in 62.3% of patients was cattle, in 22.95 small cattle, in 9.2% horseheads, in 7.8% the source was not established. Infection occurred, as a rule, from animals of individual farms. Among the sick, the predominant number of patients were provided by laborers, farmers, livestock breeders 68.2%, veterinary workers accounted for 4.4%, housewives and pensioners 22.4%. Due to

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the presence in the territory of the South of Kyrgyzstan a significant number of soil foci of anthrax 772 (47.1%). Localization sites of 52.9% of the recorded soil foci have not been found and they remain potentially dangerous. In the formation of natural foci, the main role was played by cattle (61.8%), a somewhat smaller role was played by small cattle (30.8%). Natural foci (8.1%) are taken into account. This was facilitated by a sharp change in natural and climatic conditions: hot, dry summers, frequent landslides, mudflows, and floods. Infection occurred in the process of forced slaughter of sick animals, skinning, butchering carcasses, etc. The slaughter was carried out on their own backyards, without the knowledge of veterinary workers and veterinary examination. In general, in the South of Kyrgyzstan, there was a low coverage of animal vaccination, before the outbreak, only up to 41% were covered, after the epidemiological incidence - 83%. Patients were admitted to hospitals in August, September, November 80.8%. According to the literature data, 79.8% of cases occur in July and October, which coincides with our data.

Table 1

ANTHRAX PREVALENCE RATE AMONG THE POPULATION IN THE PERIOD FROM 2015-2020

Total n=109	*years*					
	2015	*2016*	*2017*	*2018*	*2019*	*2020*
Abs.n. %	20.1%	16,5%	12.8%	27.5%	4.8%	18.3%
±	±8,5	±8,7	±8,9	±8,1	±9,5	±8,6

Of the analyzed periods, the largest share falls on 2018, which is 27.5%. In 2015, a total of 22 cases were registered in the region (intensive indicator 20.1) against 5 cases (intensive indicator 4.8), for 2020 an increase of 18.3 times.

Table 2

AGE STRUCTURE OF PATIENTS WITH CUTANEOUS ANTHRAX

Age, years	*7-14*	*15-19*	*20-29*	*30-39*	*40-49*	*50 and older*
Total 109	20	15	29	32	10	3
Specific gravity % to the total number	18.3±14.7	13.7±11.7	26.6±18.9	29.3±20	0.9±8.2	2.7±2.6

As can be seen from Table 1-4, in the age structure, 29.3% of the incidence occurs in the adult working-age population. This concept is explained by the fact that persons of mature age, and with a predominance of males, due to a more active lifestyle, are more at risk of infection.

Table 3

THE SOCIAL STATUS OF PATIENTS

Total	*Pupils*	*Employees*	*Livestock farmers in the private sector*	*workers*	*Non-working*	*students*
109	4	-	38	21	40	6
	3.6%±9.3	0%	34.8%±7.7	19.2%±8.5	36.7%±7.6	5.7%±9.4

Infection occurred, as a rule, from animals of individual farms. Among the sick, the predominant number of patients by social status is 36.6% of the unemployed, 34.8% of private sector livestock breeders, 3.6% of schoolchildren, 19.2% of workers and 5.5% of students.

Table 4

PATIENTS BY SOURCE OF INFECTION

Total	*Participation in the slaughter of cattle*		*When cutting carcasses*		*contact with raw meat*	
	n	*%*	*n*	*%*	*n*	*%*
n=109	54	49.5±6.7	37	33.9±7.7	18	16.5±8.7

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According to the sources of infection: 49.5% were infected by the forced slaughter of animals, 16.5% by contact with raw infected meat and 33.9% by butchering the carcass. The largest number of soil foci of anthrax was recorded in the Jalalabad region. In 2015, 351 soil foci were registered, of which 155 (44.1%) were found, 155 (100%) were concreted, 139 foci (89.6%) have identification marks, a decrease due to Nooken district 1, Suzak district by 9, and in 6 outbreaks in Jalalabad city, 89 (57.4%) have fences. Reduction due to Nooken and Suzak districts in 29 outbreaks, in Jalalabad in 6 outbreaks and in the city of Tashkumyr there is no outbreak. Since fences and identification marks are in most cases installed from wooden bars and taken away by the population. In total, 3 active foci over the past 5 years have been registered in the Suzak region: Of the new foci of anthrax, 67 soil samples were examined in the laboratory, of which anthrax bacillus was isolated in 4 samples.

Table 5

TERMS OF TREATMENT OF PATIENTS FOR MEDICAL CARE

1st day	*2 and 3rd days*	*4-5 days*	*total*
n	25	84	109
%	23% ±8.4	77.0%±4.5	100%

Table 6

DISTRIBUTION OF PATIENTS WITH CUTANEOUS ANTHRAX BY SEX

	Women	*Men*	*Total*
n.	24	85	109
%	22,0%±8.4	78±4.4	100

Table 7

DISTRIBUTION OF PATIENTS WITH CUTANEOUS ANTHRAX ACCORDING TO SEVERITY

	Mild	moderate	severe	Total
абс	70	31	8	109
%	64,2±5,7	28,4±8.0	7.4±9.2	100

Table 8

INDICATORS OF ACTIVE FUNCTIONS OF PATIENTS

Indicators	*Number of patients n=109*		*Confirmed diagnosis*
	абс	*%*	
SpO2< 90%	-	-	+
SpO2 < 93%	7	6.4%	+
SpO2> 93%	-		+
SpO2> 94%	-		+
SpO2> 95%	102	93.5	+
SpO2=95%	-		+
Respiratory rate>24 per min	2	1.8	+
Pulse rate >100 Min	-		+
Systolic BP 90	-		+
Diastolic BP 60мм. рт. ст.	3	2.7	+
Pulse rate >90 in Min	-		+
Pulse rate<90v Min	109	100	100

All patients were prescribed intramuscular penicillin, 1 million — 2 million 4-6 times a day, tetracycline 2 g per day for 10 days, doxycycline 2 g per day for 10 days, amoxacillin 2 g per day

for 10 days, ciprofloxacin 1 g per day for 10 days and pathogenetic therapy. The patients were discharged after clinical recovery from the moment of carbuncle prolapse. Due to the absence of specific anti-anthrax globulin (serum), the latter was not used in the treatment of patients.

Thus, according to our study, patients were admitted to the hospital in the summer from 4 days of illness or more. Males predominated by sex, mild by severity. It should be noted that at present the epidemiology and epizootology of anthrax have changed significantly compared to the period of collective animal husbandry [6]. Prerequisites for the growth of soil foci of anthrax, and uncontrolled rearrangement of livestock are the reason for the existence of many foci of anthrax in the Republic and the increase in the incidence of people.

Conclusions:

1. The main features of the epidemic process of anthrax remained unchanged. The following features have survived:

- uncontrolled backyard forced slaughter of animals affected by anthrax without prior veterinary examination and laboratory testing

- the sale of meat and offal from dead and forcedly slaughtered animals that did not pass the veterinary examination in market conditions, through the distribution network.

2. However, it should be noted some new features of the epizootic process that has manifested itself in the southern regions of Kyrgyzstan over the past decade. These include: - the predominance of the environment of diseased animals that are in the personal possession of the population - the increase in outbreaks in settlements previously unknown as stationary unfavorable for anthrax - the tendency to shift the territorial confinement of the incidence in the south of Kyrgyzstan.

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