

Studying of Species Composition of Activators of Skin and Visceral Leishmaniasis in the South of Kazakhstan

Kozhabayevich KM*, Dossanuly SR and Zhanabayevich OA

M. Auezov South Kazakhstan State University, Shymkent City, Kazakhstan

Abstract

In this article is considered the data of species composition of pathogens of skin and visceral leishmaniasis in the South of Kazakhstan. The research results are shown that the studies within the stationary conditions landscapes differ by all indications, determining the intensity of epizootic: contamination of great gerbils, the nature of mosquito species complexes and their abundance on promastigots infected mosquitoes.

Considering the above, there is basis to assume existence on the studied by us territory of the independent natural centers or well shown morphological shares of the natural centers of zoonotic skin leishmaniasis which, most likely are dated for the certain studied landscape.

Keywords: Leishmania; Mosquitoes; Parasite; Skin; Visceral; Zoonotic skin; Epizootic; Infectiousness

Introduction

There are two species of a parasite of Trypanosomatidae family gained distribution in Central Asia as well in the natural centers of the Republic of Kazakhstan. One of the – *Leishmania infantum*. This parasite is the activator of visceral leishmaniasis, other *Leishmania major* which proves as the activator of zoonotic skin leishmaniasis [1].

According to experiments in Kyzylorda region in 1997 by Professor Strelkova M.V. at white chickweed/sandwort - *Rhombomysopimus* - are allocated strains of *L. turanica*, *L. gerbiluu*, *L. major*, among which the first prevails. The European biobank of strains of leishmania of Central Asia has registered these data. From them only *L. major* has epidemiological value. However also the role of other activators in transfer of invasion is not excluded, for what additional researches are required [2].

Definitive or final owners of these parasites are domestic and wild animals, also as well as the person. The owner catches after stings of mosquitoes, infested by this parasite, besides he remains the constant carrier of the activator.

Historically leishmaniasis is very actual parasitic illness for Kazakhstan. In the Republic of Kazakhstan the active centers are located in the southern regions of the country: Kyzylorda, the South Kazakhstan and Zhambyl regions. Only for the last 9-10 years it is recorded skin leishmaniasis on the republic - 221 cases, and visceral leishmaniasis - 11 cases. The lethality has been registered at visceral leishmaniasis in 8 cases. Lethal outcomes from visceral leishmaniasis. Visceral leishmaniasis is lethal because of the late address of the population, serious associated diseases and that we consider important, absence at specialists of vigilance to this type of pathology. 2 lethal outcomes have been recorded In Kyzylorda region that are complication and weighting of epidemiological situation in region [3].

For the first time this parasite in the domestic and run wild dogs in Kyzylorda region was found in the middle of the XX century by the doctor F. Chun-Syun [4,5].

After that on studying of leishmaniasis diseases, and also by observation over ecological situation on distribution of mosquitoes the systematic clinic-epidemiological and other researches were not made. About 30 years ago the Institute's scientists of medical parasitology

and tropical medicine named after E.I. Martsinovsky conducted applied researches on studying of the centers visceral in the territory of Central Asia, including Kazakhstan and Transcaucasia. In Kazakhstan visceral leishmaniasis cases generally were registered in the floodplain of the Syr-Darya River in Kyzylorda region where the natural source of the activator – *Canis aureus* L and *Vulpes corsac*, and carrier - *Phlebotomus mirnovi* has been established. The synanthropic centers of visceral leishmaniasis which were registered earlier in the cities of Zhambyl (nowadays Taraz) and Shymkent where dogs were probable sources of infection, and *P. longiductus* carrier, were not active. In the present time the researches on this subject in Kazakhstan are not conducted, human cases skin and visceral and cases of lethal outcome (generally children) from the visceral are only registered.

Materials and Methods

Work was carried out in 2015 at the laboratories of parasitology of "Pathology of Animals" Department of the South Kazakhstan State University named after M. Auezov. In the course of researches the general technique of the organization of such experiences has been fulfilled, where some specifications on collecting materials and their processing, and also methodical character have been made.

Researches were conducted only in stationary conditions in Kyzylorda, the South Kazakhstan and Zhambyl regions. Leishmaniasis infectiousness of mammals was established on visually confirmed defeat of integuments with rare indumentums on different sites of the head (it is established that auricles and very exceptional cases of lip, nose or eyelids are struck, most often). Dabs were made of these sites. Dabs for researches of the big sandwort, both sick, and healthy, were made of extreme (regional) site of auricles.

***Corresponding author:** Kozhabayevich KM, M. Auezov South Kazakhstan State University, Shymkent City, Republic of Kazakhstan, Shymkent city, Tauke-khan avenue 5, Kazakhstan, Tel: 87252535048; E-mail: ortaev@mail.ru

Received February 09, 2016; **Accepted** July 01, 2016; **Published** July 10, 2016

Citation: Kozhabayevich KM, Dossanuly SR, Zhanabayevich OA (2016) Studying of Species Composition of Activators of Skin and Visceral Leishmaniasis in the South of Kazakhstan. J Material Sci Eng 5: 268. doi:10.4172/2169-0022.1000268

Copyright: © 2016 Kozhabayevich KM, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Researches in Kyzylorda region were conducted in the Zhanakurgan district in the neighborhood of the settlements of Tugusken and Birlik (about 50 sq.km). This site is on average watercourse Syr-Darya. This area is known long since as one of the most unsuccessful in the epidemiological plan for zoonotic skin leishmaniasis. Because lately it has not been registered cases of this disease, the decision on special inspection of the population of this area has been made by us.

Under supervision there were only 27 holes in different natural boundaries and sand of the studied territories. During the whole season of activity of mosquitoes in each hole weekly caught by means of tin funnels with the cages from capron thread on the narrow end established in 20 openings of hole (exposure - 2,5 hours after calling of the sun), an also on the sheets of special sticky paper inserted into 20 openings of hole (flypapers kept in holes from 18 to 6 o'clock morning). The distributions of mosquitoes given about the general patterns have been as a result received.

Results and Discussion

According to the planned work of researchers certain work on studying of species composition of activators of skin and visceral leishmaniasis in Kyzylorda, the South Kazakhstan and Zhambyl regions is carried out now. In the village of Tugusken of the Zhanakurgan district of Kyzylorda region, test was selected from point of marrow from 50 dogs of whom did dabs for microreproduction. Aflagellar forms of leishmaniasis (amastigota) was not revealed at research under microscope and also sample from suspects on clinical sign is taken from 2 dogs.

From the study it was found that the small firms knots were found in one dog on the head, and at another on the head which has two cankers on 5 mm everyone are revealed. From the first dog sample of syringe was taken from small knots; which have cleared canker of the second dog sterile tampon. After the preparation of granulation fabricis, dab was made. Final step was coloring the agent according to Romanovsky-Gimz and it was then micro-reproductioned. The activator of leishmaniasis was not revealed from the first dog, and from the second dog the sample was taken from canker which had shown positive results.

The sample was then taken for aflagellar forms-Leishmania major-the activator of zoonotic skin leishmaniasis was found. When coloring agent dab was added the kernel of parasite becomes red color, and cytoplasm becomes blue. In the meanwhile, sampling was carried out from mouse-like rodents. In particular at white sandwort - 40 tests, from them in 2 tests leishmaniasis infantum - the activator of visceral leishmaniasis was revealed. Similarly, work was carried out in the Merke district of Zhambyl region and in the Otrar district of the South Kazakhstan region where activators of leishmaniasis were found of both types. The study was carried out collecting mosquitoes of 1000 copies. During research, it was revealed from 15 copies, that aflagellar forms of leishmaniasis (promastigota) were found. Specific accessory identification of activators was carried out *in vitro*.

Dominant and subdominant species of mosquitoes had been defined like their number and seasonality of flying. Usually mosquitoes flights begin at the beginning of May and ultimately climate change influences flight of mosquitoes on the settlement. Mass flight begins at the end of May. From 1000 mosquitoes of 700 mosquitoes were found to be dominant. *Phlebotomus papatasi*, and subdominant 300 mosquitoes of *Sergentomyia graecovi* and *Ph. caucasicus*. The researcher on study reveals that district the following species of

mosquitoes meet: *Ph. andrejevi*, *Sergentomyia graecovi*, *Ph. sergenti*, *Phlebotomus papatasi*, *S. Clydei*, *Ph. Caucasicus* and *Ph. smirnovi*. From the study, it was revealed that by quantity the special leader *Ph. papatasi* was dominants, subdominants were *Sergentomyia graecovi* and *Ph. caucasicus* were not considered because of their small number. While considering the climatic conditions of the studied regions was necessary to expand coverage zone of catching of mosquitoes.

Difficulties in implementation of actions for protection of the population living in these areas from diseases of the studied pathologies which in big degree was caused by insufficient study of features of epizootic and epidemic process in areas with different environment. Infectiousness of mosquitoes were determined by aflagellar form of leishmaniasis (promastigota) through various research of intestinal contents of females (more than 1000 researches) and also, by allocation of live leptomonadny cultures (about 600 dabs). From the study of dabs it was shown that average infectiousness of *Ph. papatasi* makes 7.4%, and that time as *S. Graecovi* - 4.4%. *Ph. caucasicus* was defined only in 2.6% of cases 203 *Ph. papatasi* were investigated by method of inoculations of medium. From them 20 cultures of promastigote were allocated; *Sergentomyia graecovi* (N = 295) 7 of cultures promastigote *Ph. caucasicus* (N = 80). In all cases results were negative. On all studied sites of the valley of the Syr-Darya River mosquitoes have been found.

It is obvious that in holes of big sandwort there passes the most part of life of mosquitoes, and there is transfer of the activator of leishmaniasis by them from one little wild beast to another. For explanation of differences of infectiousness of big sandwort and mosquitoes, the attention has been paid on to holes of animals. Studying of these holes has shown that the structure of these dwellings of animals depends on their location in landscape and soil features of the soil, such as density, mechanical structure, humidity and temperature of soil.

The studied reveal is provided by three types of landscape:

1. Landscape of ridge and hilly sand;
2. Valley landscape of average watercourse Syr-Darya;
3. Landscape of the hollow - wavy sand.

They objectively differ through character of different forms of relief, on soil vegetable cover and on the origin. In the studied territory, it was possible to meet practically all mammals registered as epizootic of visceral and skin leishmaniasis. In spite, of the fact that the number of long-clawed ground squirrel and big sandworts was at the high level in all desert landscapes, total quantity of individuals of small sandwort during our researches was low.

Except big sandworts, in epizootic cases of skin leishmaniasis, reitailed and midday sandworts, big-eared hedgehog and long-clawed ground squirrel was also the participant. Patients of individuals have been found only among big sandworts (N = 1860 individuals). Among other rodents (redtailed sandwort (N = 87), midday sandwort (N = 128), gophers (N = 121)) noticeable damages of skin was noted.

From the studied 22 individuals of hedgehogs at 3 the defeats visually similar to leishmaniasis have been found, however parasites in dab preparations there was not revealed. Researchers want to note that despite big infectiousness of big sandworts to 15% in the intensive epizooty, among individuals which is conditionally called by minor types of carriers of sick animals it was not revealed.

Considering the above study, assumptions can be made on the existence of the study by the territory of the independent natural centers or well shown morphological shares of the natural centers of zoonotic

skin leishmaniasis which most of them are dated for the certain studied landscape. Owing to insufficient development of complex questions of structural features of the natural centers, more specific definition of taxonomical situation was not represented at the possible moment that demands further researches.

It allows study of those structural features of the natural centers of everyone where studying of the epizootic occurring in smaller area of dwelling of animals-carriers can be seen. There is high probability of skin leishmaniasis other patterns of existence of the natural centers will be revealed. However we hope that the experience of carrying out stationary works stated by us can be considered when developing the general techniques.

Conclusion

As have shown results of our experiences, in the landscapes investigated in the conditions of hospital distinctions on many signs which are defined by intensity of epizootic are noted. It is infectiousness of sandworts, mosquito infectiousness of promastigote, character of

specific mosquito complexes and on their abundance. We highlight that for standardization of data on different types of the natural centers it is necessary to bring together and to compare techniques of researches in this field.

References

1. Pronin AI, Kudryavtsev NA, Ivanov AA, Dikov VA, Rybkin GS (1996) Apparatuses having batteries of hydrocyclones made of plastics. Chemical and Petroleum Engineering 32: 375-379.
2. Lipton M, Longhurst R (1977) New Seeds and Poor People. Taylor & Francis, UK.
3. Sukhomlinov VN, Manzhurina OA, Romashov BV, Skogoreva AM (2014) Epizootic situation on cryptosporidiosis in cattle in the cattle farms of the belgorod region. Theory and practice of parasitic diseases of animals 15: 298-301.
4. Chun HF, Lee L, Chang FR (1994) Robust control analysis and design for discrete-time singular systems. Automatica 30: 1741-1750.
5. Huang CY, Wang DY, Wang CH, Chen YT, Wang YT (2010) Efficient light harvesting by photon down conversion and light trapping in hybrid ZnS Nanoparticles/Si Nanotips solar cells. ACS Nano 4: 5849-5854.