Short Reports

THE PROBLEMS AND PROSPECTS OF THE STRUGGLE WITH LEISHMANIASIS

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Leishmaniases are diseases caused by protozoa belonging to the genus *Leishmania.* Leishmaniasis, a vector-borne disease caused by obligate intramacrophage protozoa, is characterized by diversity and complexity. Leishmaniasis is endemic in areas of the tropics, subtropics, and southern Europe, in western Asia, and from rural to periurban area. Now the increase of migration of population in Europe (EU) and in Russian Federation (RF) due to touristic and business travels to endemic areas. Furthermore the arrival of migrants from other endemic countries significantly complicates the epidemic situation of leishmaniasis. Considered that the infection is transmitted by phlebotominae (sandflies), nematocerous diptera with a terrestrial life cycle, related to environmental degradation. Risk factors for infection include: socio-economic conditions (including malnutrition), migration and population movement, changes in the environment (urbanization, domestication of the transmission cycle and the penetration of agricultural farms and settlements into forest areas), climate changes (global warming and soil degradation).

Cutaneous leishmaniasis is one of the 10 most frequently imported diseases in tourism. Most often, cases of zoonotic cutaneous leishmaniasis (ZCL) introduced, caused by *L. major* have been introduced. At present, leishmaniasis, including ZCL, tends to spread to formerly not endemic countries. Although not all leishmanial infections lead to overt clinical disease, animals and human beings frequently do develop the disease, A characteristic feature of ZCL are: the duration of the disease is 5-7 months, significant size ulcers and preservation of well-marked scars on the skin of the sick. Another form of leishmaniasis is visceral leishmaniasis (VL) caused by *Leishmania infantum*, endemic both in EU and in RF, zoonotic also with domestic dogs as reservoirs. Not all leishmanial infections lead to overt clinical disease, but in those infected animals and persons who do develop the disease. In this case the multiplication of the parasites in the reticulo-endothelial system causes prolonged fever, anaemia, hepatosplenomegaly and weight loss. Visceral Leishmaniasis is fatal if it is not adequately treated. Leishmaniasis, a vector-borne disease caused by obligate intramacrophage protozoa, is characterized by diversity and complexity. Leishmaniasis is endemic in areas of the tropics, subtropics, and southern Europe, in western Asia, and from rural to periurban area. Now the increase of migration of population EU and RF due to touristic and business travels to endemic areas and the arrival of migrants from these countries significantly complicated the epidemic situation of these infection. At present, leishmaniases, including ZCL, tend to expand the range. Risk factors for infection include: socio-economic conditions (including malnutrition), migration and population movement, changes in the environment (urbanization, domestication of the transmission cycle and the penetration of agricultural farms and settlements into forest areas), climate changes (global warming and soil degradation). There is an increase in the number of countries from which the importation of leishmaniasis takes place in the EU and RF.

Cutaneous leishmaniasis is one of the 10 most frequently imported diseases in tourism. Most often, cases of zoonotic cutaneous leishmaniasis (ZCL) introduced, caused by *L. major*. Characteristic features of ZCL are: the duration of the disease (5-7 months), significant size ulcers and preservation of well-marked scars on the skin of the patient. To date, there is no effective method or remedy for all forms and syndromes of leishmaniasis. In addition, existing methods of treatment, as a rule, do not lead to parasitological cure, and relapses under conditions of immunosuppression are frequent. There are a number of methods for treating various forms of leishmaniasis and the preferences for the first and second line choice of therapy vary from the type of disease and are often based on the experience of physicians in a particular region [1, 2].

Early case detection followed by adequate treatment is also central to treat leishmaniasis and to control of the spread of VL from infected dogs to people Leishmaniasis. Good results of treatment so rely on sensitive and specific diagnostic tools. Although the need for accurate Leishmaniasis diagnostics is obvious, innovation in this field has been slow. Several serological tests have been developed, but they cannot show a 100% specificity, mostly in countries where other flagellates (i.e. Trypanosoma spp.) would occur none are specific for Leishmaniasis disease as such, although they these tests have proved useful in combination with a clinical case definition. New diagnostic tools are needed advisable for more than just the confirmation of Leishmaniasis. Usually Golden standard in the diagnosis relies on microscopical detection of the amastigotes in the lesions by direct visualization of the amastigotes. However, the retrieval of tissue samples is often painful for the patient and identification of the infected cells can be difficult, especially when scanty parasites occur

in the examined tissue. So, other indirect immunological methods of diagnosis are developed, including immune-fluorescent antibody test (IFAT) enzyme-linked immunosorbent assay (ELISA), antigen-coated dipsticks, and direct agglutination test at all. But they are not the gold standard diagnostic tests due to their insufficient sensitivity and/or specificity. Several different polymerase chain reaction (PCR) tests are available for the detection of Leishmania DNA. By means of this assay, a specific and sensitive diagnostic procedure is finally possible. Diagnostics of Leishmaniasis in animals are based on researches of serum (mainly IFAT or ELISA) to find antibodies G (IgG). High concentration of antibodies would confirm clinically Leishmaniasis or specify a possible infection of the infected dog without clinical signs. Detection of pathogen can help to confirm with method PCR, but this method alone would not allow to come to a conclusion concerning a clinical picture. For this reason IFAT remains the method of first choice for the diagnostic of Leishmaniasis in dogs, and controversial results should be confirmed by PCR [1].

Molecular tools are in fact useful, mostly as confirmatory tests. These techniques require skilled technicians and equipped laboratories; furthermore none of these tests can provide data about the outcome of the infection. For these reasons other techniques, for example crystallography [3]. Crystallography would appear as promising tools, mostly in diagnosis of VL both in dogs and humans. We consider that the crystallography would be a perspective method of diagnostics and prognostics of the Leishmanias both alone and in combination with other methods. Biocrystallography (Biocrystallomics) is a new synthetic biomedical science that studies human and animal biological substrates crystallization, earlier the method of biocrystallography was used for diagnostics of Trichinellosis. Estimated indicators for crystallogenesis were used: The basic indicators: 1. The structure index [SI] can be 1-Low, 2-medium, 3-high, also crystallization rate [CR] (1-Low, 2-medium, 3-high) we can see in the sample of leishmanias serum high level of CR. Supplement parameters are facia destruction degree [FDD]); chaos index [CI]) ect, but they can vary in the different samples of infected biosubstrates. So, it is possible to study biogenic crystals structure with leishmaniasis; investigation of biocrystallization estimation informativity of samples with Leishmania; estimation of prognostic role of biocrystals in comparison of IFAT titers of ELISA. Because serological tests none are specific for Leishmaniasis disease, although they have proved useful in combination with a clinical case definition and crystallography.

References

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