Prevalence of Visceral Leishmaniasis in Hospitalized Patients as an increasing Public Health Problem

Abstract

Introduction: Globally, Visceral Leishmaniasis an increasing public health problem, as evidenced by markedly increasing incidence rates and multiple outbreaks in all continents. Visceral Leishmaniasis is probably the most widespread and prevalent zoonotic disease in the world. World Health Organization estimates the worldwide prevalence to be approximately 12 million cases, with annual mortality of about 60,000. The size of population at risk is about 350 million.

Methods: Sera of 150 patients were analysed by indirect enzyme linked immunosorbent assay (ELISA). Serum was collected from patients with VL before the onset of treatment. Serum was separated from 1mL and stored at -20 °C.

Results: For two years from January 2011 to December 2012 in our laboratory were examined 150 cases (hospitalized patients for IgG antibodies. The mean age was 15.44 with minimum 1 and maximum 69, standard deviation 16.577. The city of Durrës represents 40.7 % of all cases. The prevalence for antibodies IgG was 17.3%. There was no significant relationship between antibodies IgG and sex, age and residence of patients.

Conclusion: The prevalence of Leishmania in our patients is high but was not found an association regarding residence, age's group and sex.

Keywords: Visceral Leishmaniasis; ELISA; Antibodies IgG; Hospitalized patients; Zoonotic

Abbreviations: VL: Visceral Leishmaniasis; WHO: World Health Organization; CL: Cutaneous Leishmaniasis

Introduction

Visceral leishmaniasis was a parasitic infection primarily caused by Leishmania donovani in the Old World, and by Leishmania amazonensis in the New World [1]. Broadly speaking, the leishmaniases can be divided into two larger groups of diseases: visceral leishmaniasis (VL) and cutaneous leishmaniasis (CL) [2,3] and are primarily endemic in tropical and sub-tropical regions. The leishmaniases are believed to be endemic in 88 countries [4] on five continents like Africa, Asia, Europe, North America and South America.

World Health Organization (WHO) estimates 350 million people are at risk. An estimated of 2 million new cases (1.5 million cases of CL and 500,000 of VL) occur annually, with about 12 million people currently infected [5]. Leishmaniasis caused by L. infantum is usually considered to be a zoonosis, although congenital infections have been reported even in Europe [6] and in those countries this disease appears to be spreading northward from its traditional foci. VL also called as Kala-Azar [7] is a chronic illness that is characterized by irregular bouts of fever, anemia, hepatosplenomegaly and leucopenia, swelling of the spleen and liver and progressive substantial weight loss. In its more severe forms, the disease can cause serious disfigurement as well as death if left untreated. Leishmaniasis is popularly caused by several species of flagellated protozoan parasites. The vector is the female sand fly, and the dog is the reservoir in most of the regions. The causative organism was first isolated in 1903 [8]. In vertebrates, the amastigote form parasites are found intracellular in the reticulo endothelial system. This form is a flagellate, round, and 2-4 μm in diameter (Leishman-Donovan body). The promastigote form found in the vector is flagellate, 15-20 μm long and spindles shaped [1]. VL was rapidly becoming an important opportunistic infection in areas where it coexists with HIV, in southern Europe, where 25-70% of adult VL cases are associated with coexistent HIV, and 1.5-9.5% of individuals with HIV from newly acquired or reactivated VL [9-11].

Materials and Methods

This study was conducted at the Medical clinic “Hamdi Sulçebe”, with collaboration of University Hospital Centre “Mother Tereza”, Tirana, Albania.

In this study, sera of 150 patients were analyzed for the presence of antibodies IgG for VL by indirect ELISA technique. Microtiter strip wells are precoated with Leishmania antigens to bind corresponding antibodies of the specimen. After washing the wells to remove all unbound sample material horseradish peroxidase (HPR), labelled Protein A conjugate is added. This conjugate binds to the captured Leishmania specific antibodies. The immune complex formed by the bound conjugate is visualized by adding Tetrathylbenzidine (TMB) Substrate Solution, which gives a blue reaction product. The intensity of this product is proportional to the amount of Leishmania specific antibodies.
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in the specimen. Sulfuric acid is added to stop the reaction. This produces a yellow endpoint color. Absorbance alternative 450nm is read using ELISA microwell plate reader. Serum was collected from patients with VL before the onset of treatment during January 2012 to December 2012. Serum was separated from 1mL and stored at -20 °C. All these individuals had no past history of VL. These patients were recruited and treated at Hospital of Infectious Disease and Hospital of Pediatric. The serological data, thus obtained were analyzed with SPSS 16 softwares.

Results

During January 2011-December 2012 in our Laboratory were examined 150 sera for Leishmaniasis. The sera have come from University Hospital Centre "Mother Theresa", Infectious Disease Unit and Pediatric Unit to Medical clinic "Hamdi Sulcebe". All cases were hospitalized patients with clinical sign like Fever, Anemia, Lymphodenopathy, Splenomegaly, Hepatomegaly, Anorexia, Vomiting, Diarrhea, Malnutrition, Cough, etc.

Clinical and serological findings

Of the 150 (100) individuals examined, a total of 55 (36%) presented with some degree of splenomegaly: out of these 55 individuals, only 23 (41%) presented with other classic signs and symptoms such as pallor, weight loss, and fever. About 3% of them were patients with HIV-AIDS. Symptomatic VL is a frequent disease among human immunodeficiency virus type 1 (HIV-1)-infected patients from the Mediterranean basin [11-13]. The overall antibody prevalence IgG by ELISA was 17.3% (26 positive cases) (Figure 1).

Out of all patients, 102 (68%) of them were males and 48 (32%) were females (Figure 2). There was no significant difference in gender with the disease. The difference in prevalence of positive cases among females (26.9%, 7 of 48) and males (18.6%, 19 of 102) was not statistically different.

The mean number of patients examined were 15.44 with mode 3 with the standard deviation (Std)=16.57. There was no significant difference in age with the disease. The data are groped in three groups. Based to data calculated we can say that: the first group were the pediatric age less the 15 (<15years old). This is the predominant group in this study with 105 (70%) cases in total. The second group was the active group 16-50 years old with 35 (23.3%) cases in total, and the third group was more than 51 (>51years old) with 10 (6.7%) (Figure 3).

The patients were from different city of Albania. The higher number of cases examined were from Durres city 61 (40.6%) of cases in total, Tirana city with 34 (22.6%) cases, 21 (14%) cases for Fier city and with 1 (0.66%) of cases resulted this number for patients from Shkoder city. There was no significant difference between places from the patients living and disease (Figure 4).

Discussion

In this paper, we studied the prevalence and distribution of VL over two years (period from January 2011 until December 2012). The incidence of zoonotic VL caused by L. infantum in humans is relatively low (0.02-0.49/100,000 in the general population) with an average of about 700 clinical cases reported each year in southern Europe [14,15]. Increasing evidence suggests that elevated rates of asymptomatic L. infantum carriers are an indicator of the intense Leishmania circulation in southern
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Conclusion

Visceral Leishmaniasis (VL) is a grave public health problem in the world and particularly in Albania. Health authorities are unlikely to be resolved this disease by the current strategies. Understanding the transmission dynamics of VL could lead to sustainable prevention and control measures. A community-based VL control or suppression program could be formulated on educating residents of this endemic area about the risk associated with house construction and the proximity of domestic animals to one’s living quarters. Alternative methods of vector control, other than the conventional indoor spraying of houses with residual insecticide (which can be prohibitively expensive) should be considered.

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