Leishmaniasis is a vector-borne disease widespread in the Mediterranean basin, including Cyprus. 

Visceral leishmaniasis (VL) is a vector-borne disease widespread in the Mediterranean basin, including Cyprus. Greece, and Cyprus.\textsuperscript{1–4} 

Leishmania infantum, Leishmania donovani, Leishmania major, and Leishmania tropica are the main species observed in this region, which are the etiologic agents of cutaneous leishmaniasis (CL), visceral leishmaniasis (VL), and canine leishmaniasis (CanL).\textsuperscript{1–3}

VL is a life-threatening systemic infection manifesting as a chronic febrile illness, marked by hepatosplenomegaly, pancytopenia, and hyperglobulinemia, and children are regarded to be at greater risk of infection.\textsuperscript{1–7}

Cyprus is a crossroad between the two continents, Europe and Asia, and the different ecological and climatic conditions of the island provide a favorable environment for Phlebotomus spp., the vectors that are responsible for the transmission of leishmaniasis.\textsuperscript{2,3,8} In particular, L. donovani causes anthroponotic CL and VL in Cyprus.\textsuperscript{3} CL and CanL cases are reported sporadically in Cyprus and no VL cases were reported in last decades.\textsuperscript{2,10} However, herein a total of three pediatric cases diagnosed with VL within the last 2 years is reported, which signifies the current status regarding the presence of leishmaniasis in Northern Cyprus.

A total of three cases (female: 2, male: 1, median age: 24.6 months) diagnosed with visceral leishmaniasis during their hospital admission between January 2011 and December 2012 are presented here, retrospectively.

Case 1 was a 16-month-old female, from Taşkent, a mountain village of Kyrenia District on the north coast of the island with caves and stone mines (Figure 1). Cases 2 and 3 were a 24-month-old female and a 34-month-old male patient, respectively, both from Sipahi village, located on the east coast of the island on the Karpassia peninsula (Figure 1).

None of the cases was associated with underlying immune failure or human immunodeficiency virus positivity. Fever, splenomegaly, and hepatomegaly were the typical findings in physical examination while marked anemia with pancytopenia, increased erythrocyte sedimentation rate (ESR) and high levels of C-reactive protein (CRP) were the most common laboratory findings (Table 1, Figure 1).

Diagnosis was performed based on abovementioned clinical and laboratory findings, and was further substantiated by a 1 ≥ 1/128 titer positivity of immune fluorescence antibody test, ≥ 1/400 titer positivity of direct agglutination test (Bio-medical Research, KIT/Royal Tropical Institute, Amsterdam, The Netherlands), positivity in rk39 dipstick assay (In Bios International, Inc, Seattle, WA),\textsuperscript{1,12} and the identification of Leishmania amastigotes in Giemsa-stained slides of bone marrow. All cases were found positive with all methods. Polymerase chain reaction and restriction fragment length polymorphism analyses of bone marrow aspiration revealed that the infecting species was L. infantum in all three cases.\textsuperscript{13,14}

As we were dealing with pediatric patients and to avoid the side effects of frequently used meglumine antimoniate, it was decided to install liposomal amphotericin B (AmBisome\textsuperscript{©}; IV, 3 mg/kg) treatment, which was administered on days 1–5 followed by the same on days 10 and 21 yielded a successful outcome with no relapse in all cases. These confirmed VL cases found within 2 years demonstrate the presence of VL on the island.

Case Report: Pediatric Visceral Leishmaniasis Caused by Leishmania infantum in Northern Cyprus

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Abstract. Visceral leishmaniasis (VL) is a vector-borne disease widespread in the Mediterranean basin, including Cyprus. During the last decades no cases were notified from northern Cyprus, but herein three cases of VL (female: 2, male: 1, median age: 24.6 months) diagnosed during their hospital admission between January 2011 and December 2012 are reported. Diagnosis was based on clinical findings; 1 ≥ 1/64 titer positivity of immunofluorescence antibodies, Leishmania amastigotes in Giemsa-stained slides of bone marrow, as well as molecular identification confirmed that in all three the infecting pathogen was Leishmania infantum. Fever, splenomegaly, and hepatomegaly were the typical clinical findings. First-line treatment with liposomal amphotericin B (AmBisome\textsuperscript{©}; intravenous, 3 mg/kg) on days 1–5, followed by the same on days 10 and 21 yielded a successful outcome with no relapse in all cases. These confirmed VL cases found within 2 years demonstrate the presence of VL on the island.
good habitant for sand flies. Oztoprak and others also found an adult leishmaniasis case who was working in the mining sector of Zonguldak, Turkey. The other two cases found in the present study were from the Karpasia peninsula, a region with low economic development and where the most important source of income is from animal husbandry. As it is indicated by WHO, people with little resources, weak immunity, poor living conditions, and malnutrition are prone to contract leishmaniasis, and therefore, this region is of concern.

The clinical features of patients diagnosed with VL in Northern Cyprus in the present study, that is, fever, hepatosplenomegaly, pancytopenia, and weight loss, are consistent with the Mediterranean type, which is mostly seen in children younger than 10 years. Elevated levels for ESR and CRP have been reported among the basic clinical and laboratory characteristics of disease in Mediterranean basin. Fever was evident in all cases in the present study, splenomegaly and hepatomegaly were the typical findings in physical examination, while anemia, increased ESR, and high levels of CRP were the most common laboratory findings and thus consistent with the Mediterranean type, which is common in pediatric age group in Turkey.

It has been indicated that several VL cases have been undiagnosed, misdiagnosed, or unreported due to lack of access to medical facilities or limited diagnostic capabilities. There was no possibility for serologic and molecular diagnosis of leishmaniasis in northern Cyprus when the cases were diagnosed. These cases indicated that the awareness of the clinician was crucial.

Early diagnosis of the disease is crucial and lifesaving as almost all untreated patients with VL die. WHO data indicate that L. infantum is the etiological agent of VL and P. tobbi the potential vector in Cyprus. Leishmania infantum was also identified by molecular methods in the three cases in the current study. This is partly in contrast to Mazeris who suggests that there are two distinct leishmaniasis transmission cycles in Cyprus. The first cycle circulates in dogs with L. infantum and the second cycle in humans with L. donovani.

In response to the increasing incidence of leishmaniasis worldwide, effective VL treatment strategies have been recommended. Pentavalent antimony compounds are the

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Epidemiological, clinical, and laboratory findings of the three pediatric cases diagnosed as visceral leishmaniasis in northern Cyprus, January 2011 and December 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 1</td>
<td>Case 2</td>
</tr>
<tr>
<td>Sex</td>
<td>Female</td>
</tr>
<tr>
<td>Age (months)</td>
<td>16</td>
</tr>
<tr>
<td>Location</td>
<td>Taşkent/Kyrenia</td>
</tr>
<tr>
<td>Spleen (cm)</td>
<td>10</td>
</tr>
<tr>
<td>Liver (cm)</td>
<td>5</td>
</tr>
<tr>
<td>Hb (g/dL)</td>
<td>4.3</td>
</tr>
<tr>
<td>WBC (mm³)</td>
<td>3,200</td>
</tr>
<tr>
<td>Platelet (×10³)</td>
<td>80,000</td>
</tr>
<tr>
<td>ALT (U/L)</td>
<td>203</td>
</tr>
<tr>
<td>ALT (U/L)</td>
<td>188</td>
</tr>
<tr>
<td>ESR (mm/hour)</td>
<td>78</td>
</tr>
<tr>
<td>CRP (mg/dL)</td>
<td>60</td>
</tr>
</tbody>
</table>

ALT = alanine aminotransferase; AST = aspartate aminotransferase; CRP = C-reactive protein; ESR = erythrocyte sedimentation rate; Hb = hemoglobin; WBC = white blood cell.
first choice of treatment, but increasing drug resistance and relapse have been documented. Therefore, liposomal amphotericin B has been considered useful in cases of treatment failure or severe side effects with antimonials. The lipid formulation of amphotericin B has been recommended as the most effective first-line drug in leishmaniasis treatment in Europe and the United States. The relapse have been documented. Therefore, liposomal amphotericin B presents as an optimal regimen as a first-choice treatment in pediatric VL. Furthermore, public health interventions need to be put in place in northern Cyprus, including awareness of the public and health professionals, vector control and appropriate diagnosis followed by effective and safe treatment to avoid further outbreaks and spread of VL on the island.

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REFERENCES