

# PEDIATRIC VISCERAL LEISHMANIASIS IN THE SOUTHWEST PART OF IRAN: A STUDY OF 215 CASES

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## ABSTRACT

**Objective:** To study the epidemiological, clinical characteristics and laboratory findings of visceral leishmaniasis (VL) in children.

**Design:** It is a retrospective study, hospital records of all children with diagnosis of VL were reviewed from 1991 through 2003.

**Setting:** Hospitals affiliated to Ahvaz Jondi-Shapour University of Medical Sciences in the southwestern part of Iran.

**Subjects:** Two hundreds and fifteen patients (153 males and 62 females) were enrolled in the study.

**Results:** The mean age of the patients was 31 ± 22 months. Fever and splenomegaly were present in >95% of the patients and hepatomegaly and lymphadenopathy in 76% and 3.7% of cases, respectively. Common laboratory findings were anemia, leukopenia and thrombocytopenia. All patients were treated with meglumine antimoniate. Relapse were observed in 4% of the patients and fatality rate was 5%.

**Conclusions:** Visceral leishmaniasis is endemic in the southwestern part of Iran. The clinical profile of the disease is typical of the Mediterranean infantile form.

**KEY WORDS:** Visceral leishmaniasis, Children, Iran.

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## INTRODUCTION

Visceral leishmaniasis (VL) or Kala-azar, is most commonly caused by *leishmania donovani*, *L. infantum* and *L. chagasi*, but on occasion other *leishmania* spp. such as *L. amazonensis* is isolated from patients with typical VL.<sup>1</sup> A viscerotropic syndrome caused by *L. tropica*

was identified among a small number of American military personnel who served in the Middle East.<sup>2</sup> The first case of VL in Iran was reported from north of the country in 1949. Therefore, increasing number of cases were diagnosed from other parts of the country.<sup>3</sup>

Presently, the major foci of the disease are located in Meshkin-Shahr in the northwest and Shiraz in the south of Iran. The epidemiological form of diseases in Iran is Mediterranean type, with a canine (dog, fox, Jackal) reservoir, and the etiologic agent is *L. infantum* which is transmitted by the bite of sand flies.<sup>4</sup>

Khuzestan Province (site of study) is located in the southwest of Iran and consists of two geographic regions (a plain and a mountainous). The population of this region is actually estimated to be 4,586,178 persons, and those younger than age 15 years comprise 30%. We performed a retrospective study of epidemiological, clinical, therapeutic features and laboratory findings of VL in children.

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## PATIENTS AND METHODS

Medical records of all children younger than 15 years with final diagnosis of VL who were admitted to two hospitals affiliated to Ahvaz Jondi-Shapour University of Medical Sciences (center of the province) were reviewed from 1991-2003. Inclusion criteria were the presence of *leishmania* in the bone marrow samples and/or a positive serologic test result (indirect immunofluorescence antibody [IFA] test >1/128). All patients' records were reviewed for age, sex, place of abode, clinical manifestations, Laboratory findings and clinical course.

## RESULTS

Two hundred fifteen patients were enrolled in the study, of which 153 were males (71%). The ages of the patients ranged from 4 months to 11 years (mean = 32 months, SD 22). The disease was most common in those younger than 2 years of age (Table-I).

The majority of the children (80%) were from rural areas and nomads. The disease was commonly observed during March-May. The most common symptom was fever. Table-II demonstrates the frequency distribution of symptoms. Fifty seven percent of the patients had abdominal distension and 49% anorexia.

Fever and splenomegaly were present in >95% of the patients (Table-III). Hepatomegaly were seen in 76% and edema in 10% of the cases, but Lymphadenopathy was found in only 3.7% of the children. Table-III. Table-IV shows the hematologic features of the children.

Table-I: Age-related distribution of children with Kala-azar

Age (years)	No. of patients (%)
<1	14 (6.5)
1-2	111 (51.6)
2-3	49 (22.8)
3-4	26 (12.1)
4-5	7 (3.3)
5-10	7 (3.3)
10-15	1 (0.4)
Total	215(100)

Table-II: Main symptoms of children with Kala-azar

Symptoms	No. of patients (%)
Fever	205 (95)
Abdominal Distension	122 (57)
Anorexia	105 (49)
Sweating	95 (44)
Pallor	81 (38)
Weight loss	74 (34)
Malaise	71 (33)
Cough	67 (31)
Vomiting	49 (23)
Chills	41 (19)

Serum aspartate aminotransferase (AST) was increased in 45.5% of the cases and alanine aminotransferase (ALT) in 19%. Hypoalbuminemia was observed in 26% and hypergammaglobulinemia in 29%. The diagnosis was confirmed in 80% of the patients by demonstration of *leishmania* amastigotes in aspirate from bone marrow and 11% of the patients were diagnosed by a positive IFA test (>1/128). Both tests were positive in 90% of the patients.

All children were treated with meglumine antimoniate. The mean dose was 16-mg antimony /kg/day (SD 5) and the mean duration of treatment was 19 days (SD 4). Relapse was observed in 9(4%) of the patients. These patients received a second course of meglumine antimoniate plus allapurinol or amphotricin B. Eleven patients (5%) expired due to infection or bleeding.

## DISCUSSION

The results of the present study indicated that VL is a relatively common disease in the south-western part of Iran. The disease was more common in younger children. Several studies in countries where infantile form of VL is common showed similar results.<sup>5-8</sup> About 70% of the patients were males. Most of the patients were from rural areas and nomads. With considering the reservoirs of the disease, are canine, this is expected.<sup>4,9</sup> The clinical manifestations of VL exhibited by the children in this sample were similar to those in published description.<sup>9-13</sup>

Table-III: Main signs of children with Kala-azar

Signs	No. of patients (%)
Splenomegaly	214 (99.5)
Fever	205 (95.3)
Hepatomegaly	164 (76.2)
Edema	23 (10.6)
Jaundice	12 (5.5)
Sparse and brittle hairs	10 (4.6)
Lymphadenopathy	8 (3.7)
Petechiae, purpura and echymosis	6(2.7)

Fever and splenomegaly were noted in more than 95% of the patients but patients were less likely to have lymphadenopathy.<sup>6,14</sup>

Anemia, leukopenia and thrombocytopenia were found with greater frequency among VL patients.<sup>9,15,16</sup> Most of our patients were also cytopenic. Detection of parasites by microscopic examination of the bone marrow confirms the diagnosis of VL, but it may be negative in some samples. Because of such negative results, serologic tests like immunofluorescence test are sometimes necessary. In this study, 11% of the patients were diagnosed by IFA test.

Meglumine antimoniate was the first-choice treatment and the side effects were very low. Clinical response was rapid, however the optimal treatment duration was shorter and the mean dose of drug was lower than the world Health Organization recommendation.<sup>17</sup> In the present study, 4% of the patients who were treated with meglumine antimoniate suffered a relapse. All of these patients responded well to the second course of meglumine antimoniate plus alluporinol or amphotericin B. Maltezou et al in a study of childhood VL in southern Greece found relapse rate of 6% in their patients.<sup>9</sup> There were 11 deaths due to associated complications (5% mortality). The mortality rate was similar to those in published literature.<sup>10,18</sup>

Table-IV: Hematologic features of children with Kala-azar

Laboratory	Mean $\pm$ SD
White blood cell count (/mm <sup>3</sup> )	4530 $\pm$ 2300
Neutrophil count (/mm <sup>3</sup> )	1300 $\pm$ 1010
Hemoglobin (g /dl)	7.1 $\pm$ 1.9
Platelets (/mm <sup>3</sup> )	109000 $\pm$ 64000

In summary, VL is endemic in southwestern Iran and the disease is more common in young children. The patients respond well to meglumine antimoniate with shorter duration and lower doses than recommend.

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