Leishmaniasis in Western Sudan: Prevalence and Clinical Picture

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Abstract

Aim of Study: To identify prevalence of leishmania cases and the clinical picture among inhabitants of the Green Valley villages in Rashad Province.

Material and Methods: The study included the total population of The Green Valley villages, Rashad Province, west of Sudan villages (N=332). Demographic data were collected using a special questionnaire. Clinical examination of all villagers was conducted. Screening for symptoms and signs related to leishmaniasis was performed. Leishmanin skin test (LST) was done to all villagers. The ball pin technique was applied after 48-72 hours. Indurations, redness and swelling more than 5mm were considered positive. Finger prick blood spotted filter papers were collected from all the villagers. All the samples were tested for leishmania parasite detection using specific donovani primers.

Results: LST results showed that 170 cases were positive (51.2%). Distribution of LST results by clinical grades according to gender showed no significant difference. Clinically, only 3% complained of diarrhea. Fever was the complaint of 34% of children and 16% adults, while abdominal pain experienced by 6.7% of children and 13.5% of adults. Clinical assessment showed that 14 individuals had enlarged liver while 50 persons showed enlarged spleen and only 63 individuals showed enlarged lymph nodes localized to the inguinal region.

Conclusions: The capability of leishmaniasis to exist in deserted areas can be explained by the disease capability to maintain internal circulation within the vectors and animal reservoirs and this can last as long as twenty years. Also there is a need to do further serological study to confirm sub clinical infection in this area.

Key Words: Visceral – Cutaneous – Leishmaniasis – Subclinical infection – LST (Leishmanin skin test) – Prevalence.

Introduction

LEISHMANIASIS is an important parasitic disease that constitutes a great public health problem to many countries. Transmission to human is via bites of female sandfly, mainly due to Phlebotomous spp. (papatas, orientalis). L. donovani complex (donovani, infantum and chagasi) cause visceral leishmaniasis while L. tropica (arthropontic) and L. major (zoontic) are responsible for cutaneous leishmaniasis. Leishmania donovani is the main causative species for visceral leishmaniasis while Leishmania major needs an animal reservoir and it is the main causative parasite for cutaneous leishmaniasis in Sudan [1,2].

In Sudan the “Leishmania Belt” extends from Gadarif Region from the east, where visceral leishmaniasis is the predominant form to Darfur Region to the west, where the cutaneous form has been reported [3]. The Nuba Mountain is situated in Kordofan Region which lies in the midway in the leishmaniasia belt. This area has rarely been studied [4,5], while several studies in the field of leishmaniasis have been conducted, mainly in the eastern and southern Sudan [3,6].

Many mobile, nomadic tribes are settled in this area from various ethnicities, such as Massaleet, Arabs and Nuba. They work as shepherds and farmers. Variable types of domestic and wild animals are found such as camels, cows, sheep, dogs and rodents. The ecology is suitable for the vector (sandfly) existence and breeding. This is shown by the presence of the sub-savanna climate and the plants forests belonging to Acasia balanitis. The cracked dry muddy sand offer sandflies the optimal breeding sites [7].

Investigations are available for detection of leishmania cases, but still the most reliable and easiest test used in screening and epidemiological tool to be used in field studies is the leishmania skin test (LST, or Montonegro test) [8].

This study aimed to identify prevalence and clinical picture of leishmania cases among inhabitants of the Green Valley villages in Rashad Province.
Material and Methods

This study followed a cross-sectional descriptive design. It was applied in the Green Valley villages, which are small villages in Rashad Province, west of Sudan. They consist of three adjacent small villages, each consists of around 24 cottages, each cottage represents a family. These villages were deserted for twenty years due to a killing disease that resembles leishmaniasis clinically, as described by the villagers. Resettling in these villages has lead to re-appearance of similar illness. The total population of these villages is 332. All inhabitants of this village were included. The field study was performed during the months of July and August 2009.

Demographic data were collected using a special questionnaire. Clinical examination of all villagers was conducted. Screening for symptoms and signs related to leishmaniasis (i.e., fever, epistaxis, abdominal pain, anaemia, enlarged liver, spleen and lymph nodes for visceral and skin ulcers, scars and mucocutaneous lesions for cutaneous) was performed.

Leishmanin skin test (LST) was done to all villagers, 0.1mL leishmanin was injected subcutaneously in the upper extensor part of the left arm. The ball pin technique was applied after 48-72 hours. Indurations, redness and swelling more than 5mm were considered positive. The LST grades were applied to plot the test results [9]. Finger prick blood spotted filter papers were collected from all the villagers. All the samples were tested for leishmania parasite detection using specific donovani primers [10]. All cases received specific anti-leishmaniasis treatment (e.g., amphotericin B), while all participants received health education on how to avoid the vector’s bite.

Results

Table (1) shows that the total study population was 332. Females were more than males (56.1% and 43.9%, respectively). LST results showed that 170 cases were positive (51.2%). Distribution of LST results by clinical grades according to gender showed no significant difference (Table 2). Clinically, only 3% complained of diarrhea. Fever was the complaint of 34% of children and 16% adults, while abdominal pain experienced by 6.7% of children and 13.5% of adults. Clinical assessment of liver and spleen enlargement among the study group showed that 14 individuals had enlarged liver while 50 persons showed enlarged spleen and only 63 individuals showed enlarged lymph nodes that were localized to the inguinal region (Table 3).
Discussion

This study revealed that prevalence rate for leishmaniasis among inhabitants of the Green Valley villages in Rashad Province is quite high, as more than half of the population were infected, i.e., 51.2%. Moreover, the distribution of LST results according to clinical grades among the study population showed that 43.1% had grade III, reflecting the long duration of their disease. These findings indicate the pressing necessity for efforts to control leishmaniasis at that endemic area.

Younger age groups had significantly higher prevalence rates than older ones ($p<0.001$). Children aged up to 5 years had the highest prevalence rate, i.e., 75%. Epidemiological studies from endemic regions worldwide showed the predominance of leishmania cases among children in indoors infections. This has been explained by the low immunity in children in comparison to adults [11-13].

In this study there were no significant gender differences as regard prevalence of leishmaniasis. This finding is not in agreement with that reported by Zhang et al. [14], who stated that sex-associated differences are known to exist in numerous diseases. Males are, in general, more susceptible, while females are more resistant to diseases. Such sex-dependence has been described for visceral leishmaniasis, which is more common in males than females. However, the nature of the studied area in Sudan, where women usually work outside homes and do all field works, similar to men may explain the gender differences based on exposure differences rather than sex-related immunity differences, as stated by Wilson et al. [12].

Clinical examination for our population revealed that fever, abdominal pain, enlargement of lymph nodes and spleen were the major symptoms and signs in our patients.

Stanley and Engwerda [15] explained the clinical picture of leishmaniasis by stating that that leishmaniasis is characterized by long term fever, spleen enlargement, immunosuppression and weight loss. The parasites inhabit the macrophages of the spleen, liver and bone marrow in the aflagellated amastigotes. During the course of the disease, there is a marked depression of cellular immunity to leishmania antigens.

This study have screened these villages and showed that the capability of leishmaniasis to exist in deserted areas can be explained by the disease capability to maintain internal circulation within the vectors and animal reservoirs and this can last as long as twenty years. Also there is a need to do further serological study to confirm sub clinical infection in this area.

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