Rapid epidemiological mapping L.donovani infection in eastern Sudan : preliminary report

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Abstract

This epidemiological survey was based on simple in vivo and in vitro immunological techniques combined with clinical history to obtain data about the spectrum of L.donovani infection in communities at risk of developing visceral leishmaniasis. The data was depicted in map format to give an enhanced visual impact. In this study clinical history and immunological tests were conducted in volunteers randomly selected from villages in an endemic area in eastern Sudan. 800 volunteers were randomly recruited with mean age of 19.7+/- 17.7 years and an equal male: female sex distribution. The overall leishmanin skin reactivity of ≥ 5 mm was 33.3 %. Children (<15 years) had higher leishmanin non-reactivity (00 mm) of 47.6% compared to 27% in adults (>15 years). The DAT results showed that 19.3% had reciprocal titers of >200 compared to 8.1% with reciprocal titers of >200 and <3200. Titers of ≥ 6400 were seen in 9% of volunteers. 80 patients with VL and 3 with PKDL were seen in the study population. All VL cases developed in leishmanin non-reactive individuals. The incidence of VL in the selected villages was calculated as 100/1000 individuals/year. This figure is comparable to published figures from longitudinal studies carried in the same area over the last six years. 8 parasite isolates from clinically responsive and unresponsive VL patients were cultured, characterized as L.donovani using PCR-HDA and RFLP. Six (6/8) L.donovani isolates that were collected from clinically unresponsive patients, 2 from responsive patients and 1 L.major isolate were tested for their in vitro sensitivities to Pentavalent antimony (Pentostam) and Amphotericin B with the following results: increasing Pentostam concentration caused a marked linear reduction in H3-thymidine incorporation that ranged from 0.1% to 6.4%. A similar result was obtained with Amphotericin B where H3-thymidine uptake reduction ranged from 0.0 to 0.5%. In a macrophage cell culture system (J774), 3 clinically sensitive L.donovani isolates and one clinically unresponsive isolate were selected for testing. The survival index (PSI) was similar for Pentostam and Amphotericin B.

In conclusion: the use of clinical interview combined with simple immunological tests can give valuable information about the pattern of L.donovani infection and predict future prevalence of VL in a short time. Leishmanin non-reactive individuals are a useful piece of data to plan for future vaccine efficacy studies. It is also clear that in vivo drug unresponsiveness does not correlate well with in vitro sensitivity for the same drugs. The interactive dynamic map that was produced in the GIS can act as a nidus for development of a Leishmania network in Sudan and the surrounding countries that are endemic for visceral leishmaniasis.