

## Re-emergence of visceral leishmaniasis in Gujarat, India

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**Background:** Leishmaniasis is a major public health problem causing significant morbidity and mortality in Africa, Asia and Latin America. It presents mainly in three clinical forms, of which visceral leishmaniasis (VL) is the most severe form. Recent outbreaks of VL in India and the epidemic of human immunodeficiency virus (HIV) make VL a re-emerging problem in India<sup>1</sup>. Outbreaks and epidemics of leishmaniasis have also been associated with urban development, deforestation, environmental changes and population migrations. Individual risk factors such as HIV, malnutrition, genetic factors, etc. are also responsible for epidemiological diversity of leishmaniasis<sup>2</sup>. Approximately, a total 500,000 VL cases occur annually worldwide of which more than 23,000 cases are from India. The present foci of VL in India are Bihar, West Bengal, Uttar Pradesh and Jharkhand<sup>3</sup>. Sporadic cases have also been reported from Gujarat (west India)<sup>4</sup>, Tamil Nadu and Kerala (south India) and sub-Himalayan parts of north India including Uttar Pradesh, Himachal Pradesh and Jammu and Kashmir<sup>5</sup>. To the best of our knowledge and available literature, after 1986 no case of VL has been reported from Gujarat so far. It is a common belief that western India has become VL free zone but this case study shows that the population of Gujarat state is again at risk of kala-azar after about 20 years.

**Case report:** A 25 year-old male from Delhi, was recently been shifted to Anand district of Gujarat and started having fever, occasional chills and rigors within five months of his stay in Gujarat, and did not respond to standard treatment. Initially, for his febrile

illness, he was investigated and treated by local physician for malaria (peripheral blood smear examination and *Plasmodium falciparum* and *P. vivax* antigen detection) and typhoid fever (Widal and TyphiDot test) but was found to be negative. He was put on antipyretics but in the mean time he also developed anaemia (haemoglobin 7.5 g/dl) and hepatosplenomegaly. However, more details of investigations were not available with the patient. When no conclusive diagnosis could be made locally, he was referred to the All India Institute of Medical Sciences (AIIMS), New Delhi, where he was again investigated thoroughly for malaria and other causes of fever of unknown origin including blood culture, chest X-ray and abdominal ultrasonography; and he was also investigated for Hepatitis B virus surface antigen (HBsAg), Hepatitis C virus (HCV) and HIV but was found to be negative for all. His family history revealed that neither his family members nor the patient visited any known endemic area for kala-azar except the patient had stayed in Gujarat for five months. He neither had any prolonged illness in the past nor did he receive blood transfusion. On physical examination he had mild fever, anaemia and hepatosplenomegaly which was further confirmed by abdominal ultrasonography. His routine serum biochemistry and haematology investigations showed total protein of 11 g/dl and albumin/globulin ratio 0.43. His platelet count was 60,000/mm<sup>3</sup>, haemoglobin level 7 g/dl, TLC 1,500/mm<sup>3</sup>, RBC count 3.73 × 10<sup>6</sup>/mm<sup>3</sup>, WBC count 1.60 × 10<sup>3</sup>/mm<sup>3</sup> with differential count of 59% neutrophils, 1% eosinophils, 2% monocytes and 38% lymphocytes.

His splenic aspirate was examined by Giemsa staining that was found positive for Leishman-Donovan (LD) bodies like structures. His bone marrow aspirate was cellular with signs of reactive marrow. His serum samples were tested by aldehyde test, anti-rK39 dipstick test (Insure™, *In-Bios* Int., USA), rKE16 latex agglutination test, and anti-rKE16 spot test (Signal KA™, Span Diagnostics Limited, India). The latter is a novel recombinant antigen recently prepared from *Leishmania donovani* strain KE16 (MHOM/IN/1998/KE16)<sup>6</sup>. The aldehyde test, rKE16 latex agglutination test, Signal KA spot test (rKE16) and *In-Bios* dipstick test (rK39) were found to be strongly positive. Using rK39 and rKE16 antigens, serum of the patient was also end point titrated for anti-rK39 and anti-rKE16 antibodies by ELISA<sup>7</sup>, which revealed strong antibody reaction with titers of 1:102400 and 1:409600, respectively. The anti-rKE16 antibody avidity examination was also done to elucidate the phase of the infection occurred. The rKE16 IgG antibody avidity was found 79.23%, which indicated that the infection occurred between 6 and 8 months<sup>7</sup>.

When diagnosis of kala-azar was established, the patient was treated with a full course of amphotericin B (50 mg/day) for 10 days. The patient started improving clinically within three days and at the end of the treatment his platelet count increased up to 1,20,000/mm<sup>3</sup>, TLC up to 2,900/mm<sup>3</sup> with normocytic and normochromic RBC picture and haemoglobin level rose to 9.5 g/dl. He was last followed-up after six months of treatment and found completely asymptomatic and all laboratory parameters were within normal limits.

The visceral form of leishmaniasis is endemic in eastern states of India. However, in last quarter of the twentieth century migration of disease was noticed and new foci of this disease were reported from previously non-endemic regions<sup>8</sup>. No case of VL has been reported from Gujarat since 1986, eventhough, sporadic cases have been reported from this area previously. Though, it is difficult to explain that how he acquired infection. The patient neither travelled any

known endemic area for kala-azar except Gujarat, nor did he has any history of blood transfusion and injection sharing, as possible source of infection.

Anand district, in the Gujarat state lies at latitude 22°14'N and longitude 72°46'E. The nature of the soil in this district is alluvial and black rocky. It also represents great river basins such as Narmada and Sabarmati. The climate of the area is hot and humid which is favourable for the incidence of kala-azar<sup>9</sup>. This case gives an opportunity to investigate whether the parasite has re-established in this part of India or it was an accidental case. It is possible that during the travel he acquired the infection. It is also possible that due to repeated spray of malathion during 1980–86 under the National Malaria Eradication Programme, which might have either eliminated the sandfly spp from the area or driven the residual population to some obscure outdoor microhabitat<sup>10</sup> and after a long time sandfly is re-habiting in the area. We cannot rule out the possibility that this leishmania strain is less virulent and might be circulating in some animal reservoirs. It is likely that the disease has been re-introduced in the state and is spread by some local species of sandfly. In either case the present case report highlights geographic changes leading to ecological disturbance with a possible spread of leishmaniasis in India with implications for its control as a public health problem.

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