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Original Article

Outbreak of cutaneous leishmaniasis in Somniani, Balochistan – implementation of preventive measures for deployed personnel of armed forces

Amer Ejaz, Naeem Raza*, Qamar Ud Din, Hussain Bux***

Dermatology Department, Combined Military Hospital, Kharian Cantonment
* Dermatology Department, PAF Hospital, Faisal Base, Karachi
** Dermatology Department, Combined Military Hospital, Malir Cantonment, Karachi

Abstract

Objective To evaluate the number of cutaneous leishmaniasis (CL) cases reporting from Somniani between years 2001 to 2005 and to explore the preventive measures being used against sandfly bite.

Patients and methods This observational study was conducted at the dermatology department of Combined Military Hospital, Malir Cantonment, Karachi from January 2001 to December 2005. Between year 2001 and 2005, suspected cases of CL reporting from Somniani, Balochistan were identified, evaluated, diagnosed and included in this study. Diagnosis was based on clinical examination, slit skin smear for detection of Leishman-Donovan (LD) bodies and skin biopsy for histopathology. Patients were then asked to fill a structured, anonymous, self-administered and close ended questionnaire which included questions about the use of various preventive measures against cutaneous leishmaniasis.

Results A total of 108 patients were diagnosed as CL from Somniani during the study period. The peak was seen in year 2004 (n=58) which coincided with increased troop activity in the area. Nodulo-ulcerative lesions were the commonest mode of presentation. Skin biopsy for histopathology was the most effective method of diagnosis. Overall only 28% personnel were using preventive measures against sand fly bite. Only 15% personnel had disease awareness.

Conclusion Lack of application of preventive measures and knowledge of disease were the reasons for increase in CL cases.

Key words
Cutaneous leishmaniasis, outbreak, preventive measures.

Introduction

Cutaneous leishmaniasis (CL) is found in more than 80 countries. The World Health Organization reports an annual incidence of 1.5 million cases per year.[1] An estimated 12 million people are infected from a population of 350 million people who are at risk.[1] Most cases of localized CL come from Afghanistan, Saudi Arabia, Syria, Iran, and the Americas. Pakistan also has a considerable number of leishmaniasis cases, both cutaneous and visceral. Prevalence has been estimated at 2.7% in the northwestern part of the country. Incidence in Pakistan

Address for correspondence
Col. Dr. Amer Ejaz,
Consultant Dermatologist
Combined Military Hospital,
Kharian Cantonment
E mail: amer_ejaz@yahoo.com

has been estimated at 4.6 cases/1000 persons/year over the last ten years.[2] With the exception of Australia and Antarctica; the parasites have been identified throughout the world.[3]

Epidemics of CL have been associated with deforestation, road construction or any other activity in which humans intrude in the habitat of the vector.[3] With the increase in international travel, immigration, overseas military exercises, and HIV coinfection, CL is becoming more prevalent throughout the world. Over the past few years, spread of CL has been reported from all over Pakistan. This includes discovery of new foci of CL[4,5,6] as well as increased number of cases being reported from the known endemic regions.[7-11]

Somniani is a coastal region situated in Balochistan province about 70 km from the cosmopolitan city of Karachi. Conventionally sporadic cases of CL were received from the area. Combined Military Hospital Malir Cantt is the tertiary care health facility for the area; hence all the suspected cases of CL are received at the skin department of the hospital. We noticed a substantial rise in the CL cases being received from Somniani and undertook to explore the reasons for the rise. In this paper, data from the area is presented and an effort has been made to evaluate the number of CL patients reporting from Somniani in the last five years and to explore the use of preventive measures being used against sand fly bite.

Patients and methods

All soldiers presenting from Somniani to the dermatology department with a clinical suspicion of cutaneous leishmaniasis fulfilling the set diagnostic criteria for cutaneous leishmaniasis and a history specifying the area of residence at the time of development of symptoms were included in the study. Patients having uncertain diagnosis were excluded. Clinical examination of the lesions was recorded. Slit skin smears were made from the active borders of the lesions to detect Leishman-Donovan (LD) bodies using standard technique.[12] Punch biopsy specimens were obtained by standard technique, targeting the lesion edge. Specimens were then paraffin embedded and stained with haematoxylin and eosin. Diagnosis was made on the basis of clinically suggestive lesion, positive slit skin smear and diagnostic or suggestive histopathologies as defined by WHO.[13] Patients were then asked to fill a structured, anonymous, self-administered and close ended questionnaire which included questions about the use of various preventive measures against cutaneous leishmaniasis as detailed in **Table 1**. Those having problem in understanding the questions were assisted.

Statistical analysis was done using computer software SPSS version 12.0. Frequencies, descriptive analysis, and percentages were presented for the variables.

Results

Figure 1 shows the annual load of CL patients reporting from Somniani from 2001 to 2005. **Table 2** summarizes the clinical characteristics and demographic profile of soldiers diagnosed with CL. Only 2 patients reported in 2001 whereas the peak was in 2004 when 59 patients were recorded. All the patients seen were males and had

Table 1 Measures needed for patient education and disease prevention.

Patient education

- Educate patients about the possibility of recurrent disease, and instruct them to schedule follow-ups as needed.
- Education on risk factors and the transmission of leishmaniasis can help reduce disease. Risk factors include the following:
    - Exposure to sandfly habitat
    - Age - Depending on infecting species and geographic area
    - Male sex
    - Adults who are immunologically naïve and entering endemic area
    - Patients who are immunosuppressed - Transplant, chronic steroid use, and malignancy
    - Malnutrition
    - AIDS
    - People who use IV drugs in endemic areas

Deterrence/prevention

- Protective immunity following medical treatment for infection is 97-98% effective for disease caused by the same species of *Leishmania.*
- Deliberate scarification (i.e., making numerous superficial incisions) of the extremities, with material from human lesions, was once practiced to prevent facial scarring that might result from a later natural infection.
- The treatment of infected persons and elimination of diseased reservoir vertebrates can reduce the source of infection.
- Sandfly control (fine-mesh bed netting must be used, because sandflies are small enough to pass through ordinary mosquito netting) impregnated with an insecticide such as permethrin or deltamethrin, and use of insect repellent can prevent disease.
- Because leishmaniasis can be transmitted through blood, patients who have been infected should not donate blood or organs.
- General precautions, such as protective clothing, and minimizing outdoor exposures at peak times (e.g., dusk) should also be used.

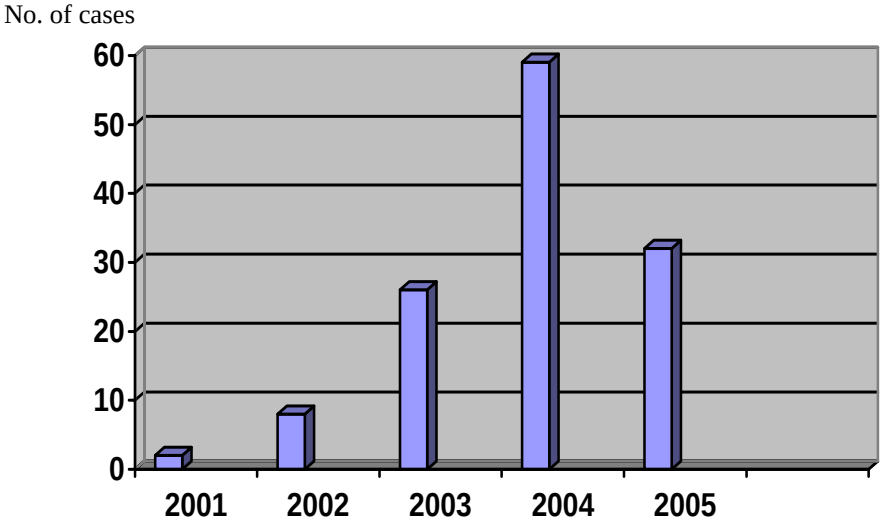

Figure 1 Annual cases of cutaneous leishmaniasis reporting from Somniani seen at Combined Military Hospital Malir Cantt, Karachi.

remained stationed at Somniani for an average period of 4 weeks. Their stay at Somniani coincided with the incubation period of the disease. Mean number of lesions per person was 2.5. Legs were the commonest site of lesions and the lowest number of lesions was seen on hands and feet. Nodulo-ulcerative lesions were the

Table 2 Demographic profile and clinical characteristics of study population

Total number of patients	108
Age and sex	17-40 years, mean 26 years, all males
Mean duration of lesion before presentation	6 weeks
Sites of lesions	Legs 45% Arms 24% Face 12% Trunk 10% Hands/feet 8%
Types of lesions	Nodulo ulcerative 64% Pustular 24% Plaque 12%
Mean number of lesions per person	2.5
Mean diameter of largest lesion (cm)	2.0
Diagnostic methods used	Skin biopsy for histopathology 58% Slit skin smear 36% Clinical 6%
Mean time taken to achieve cure	4 weeks
Use of preventive measures	All measures 28% Mosquito nets 38% Insect repellent oils 18% Clothing protection 28% Disease awareness 15%

commonest mode of presentation. Skin biopsy for histopathology was the most effective method of diagnosis and only 6% of patients had to be clinically diagnosed due to inconclusive laboratory investigations. 28% of the soldiers interviewed were using any kind of preventive measures against sand fly bite. 15% had awareness about the disease and the preventive measures. Rest of questionnaire responses is given in **Table 2**. Average population at Somniani camp was about 400 per annum which soared to 1200 in year 2004 because of a defense exhibition.

Discussion

Outbreaks of CL have been reported from several areas of the world including Pakistan. Such outbreaks have largely been reported from northern areas of Pakistan especially with the arrival of Afghan refugees.[2,5-8] Mostly the reason has been the settlement of a large population in the natural habitat of sandfly.[14]

Development of cutaneous leishmaniasis in soldiers has been reported from various regions of the world.[15,16,17] Mostly it is due to the movement of non-immune soldiers into an endemic area as well as noncompliance with the precautionary measures.[18] It is an ever present risk in Pakistan due to the endemic nature of most of the regions where Pakistan Army operates.

Somniani beach being a part of Balochistan province of Pakistan falls into the endemic areas of CL. To date only sporadic cases have been reported from the area as our data suggests. This is the first time an outbreak of CL cases has been reported from Somniani. Recently there has been movement of a large number of troops into and out of the area. In fact the peak of cases observed by us in year 2004 coincided with a large defense exhibition in the area for which a number of troops were deployed at Somniani from Malir Cantonment.

The troops moved from Malir were not exercising the precautionary measures against sandfly bite as Malir is a non-endemic area. Also they had moved for only a short period of time, average stay per

person being 6 weeks. This might have resulted in laxity in the implementation of preventive measures resulting in the rise in the number of cases reported for the year 2004 and 2005. Our results suggest that only about one third of soldiers were exercising the preventive measures.

Personal protective measures to decrease risk for infection include avoiding, if possible, areas where leishmaniasis is endemic, particularly from dusk through dawn; using insecticide-treated bed nets[19] and clothing[20]; minimizing the amount of exposed skin; and applying insect repellents containing 30%-35% DEET (lower percentages for children) to exposed skin.[21,22] Use of preventive measures against sandfly bite as well as education and awareness of troops before entering an endemic area are imperative to control the spread of disease.[23]

A recent randomized study in Venezuela evaluated the effectiveness of pyrethroid-impregnated curtains in an urban area with an incidence of cutaneous leishmaniasis of 4 percent. In 569 homes, 2,913 inhabitants were included in this study. Use of the curtains reduced the sandfly population and, 12 months after the installation of these curtains, the incidence of cutaneous leishmaniasis dropped to zero.[21]

Many preventive measures against sandfly have met with limited success. Avoiding sandflies is important but difficult, because they have adapted to urban environments. Destruction of rodent reservoirs by pumping insecticides into rodent burrows has had limited success.[7] Reservoir eradication, vector control, and mass treatment of individuals who are infected have met with some success but are limited by cost and difficulty in coordinating efforts. Permethrin-impregnated uniforms have been advocated to control infection in soldiers but a recent randomized controlled study from Iran has concluded no benefit.[24]

Of all the preventive measures being tested around the world, patient education is the most important and most effective. We, therefore, recommend that for military movement into an endemic area even for a limited period of time, troops should be thoroughly briefed about the personal precautionary measures as given in **Table 1**.

Conclusion

Lack of implementation of preventive measures resulted in an outbreak of CL at Somniani. Effective precautionary measures and education of soldiers is imperative in controlling the spread of disease.

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