

Original Article

Clinico-epidemiological pattern of cutaneous leishmaniasis in armed forces personnel fighting war against terrorism in Khyber Pakhtunkhwa Province and Fata regions

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Abstract *Background* Cutaneous leishmaniasis (CL) is endemic in various regions of Khyber Pakhtunkhwa (KPK) province and Federally Administered Areas (FATA). Troops deployed in these regions are at an increased risk of acquiring the disease as compared to the native population.

Objective To determine clinical and epidemiological pattern of CL in armed forces personnel serving in endemic areas of CL in KPK and FATA.

Patients and Method This observational/descriptive study was conducted at CMH, Peshawar from January, 2010 to June, 2010. All patients of any age reporting in skin outdoor with clinical diagnosis of CL were enrolled in the study and all were subjected to skin slit smears for *Leishman-Donovan* (LD) bodies and skin biopsies were also taken in all cases to observe histopathological features. Patients in whom clinical diagnosis was not supported by laboratory diagnosis, were excluded. Clinical and epidemiological data was recorded and finally analyzed by using descriptive statistics.

Results Out of 172 initially enrolled cases, 2 were excluded from the study as their clinical diagnosis was not supported by laboratory findings. All patients were young males (deployed armed forces personnel). Their ages ranged from 18 to 43 (mean age: 27.4 years). Number of lesions ranged from 1-11. Multiple lesions were seen in 41.2% cases only. Size of lesions ranged from 1-13 cm. 70.6% of lesions were seen on upper and lower limbs followed by head and neck region 27.6%, and trunk and abdomen 1.8%. Morphological patterns seen were crusted plaques, psoriasiform plaques, nonhealing ulcers, erythematous infiltrated nodules and papules. Majority of the cases were from the regular army units deployed in the areas in recent past (71.8%) as compared to 28.2% of native troops of Frontier Corps (FC): 3% deployment of regular troops against 0.5% of FC troops.

Conclusion CL is common in soldiers serving in KPK province and FATA regions of Pakistan. Armed forces personnel who moved from central Punjab and deployed in these areas for operations against terrorists are at much higher risk of acquiring the disease as compared to the native troops. This risk can be decreased by implementing effective precautionary measures and education of the soldiers.

Key words

Cutaneous leishmaniasis

Introduction

Cutaneous leishmaniasis (CL) is a protozoan disease with diverse clinical and epidemiological manifestations which are dependent both on the infecting species of the organism and on the immune response of the host. The disease is spread by the bite of different species of *Phlebotomine* sandflies, which inject the parasites into their hosts.^{1,2} Twenty *Leishmania* species are pathogenic for humans and 30 sandfly species are proven vectors. There are two main epidemiological entities: (1) zoonotic which includes animal reservoir hosts in the transmission cycle, (2) anthroponotic where man is the sole source of infection for the vector.³

Classically cutaneous leishmaniasis, affects the exposed parts of the body. Zoonotic disease due to *Leishmania major* is the main type of leishmanial disease in Pakistan. It usually presents with a skin ulcer caused by a sandfly bite and generally heals spontaneously within 3 to 6 months but clinico-pathological picture of cutaneous leishmaniasis, many a times, is variable depending on several host-parasite related factors.⁴ After an incubation period, mostly measured in months, but may range from a few days to over a year, lesions appear usually on the exposed areas of the skin, accessible to the vector and corresponding to the bite sites, a red furuncle-like nodule appears at the site. The papule gradually enlarges in size over a period of several weeks and assumes a more dusky violaceous hue. Eventually the lesion becomes crusted with an underlying shallow ulcer, often having raised and somewhat indurated borders.

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The healing is usually with a scar that is typically atrophic, hyperpigmented and irregular (cribriform). In addition, the classical lesions may often show clustering of lesions, skin crease orientation, volcanic nodules, satellite papules, subcutaneous nodules and iceberg nodules.¹⁻³

Over the past few years CL has extended its geographic distribution in Pakistan and has become a major public health problem.⁶ On one hand, it is found in the northern hilly areas of Kashmir and on the other in Lasbella and Makran coastal areas in the extreme southern part of the country, along with scattered foci in Punjab. No area in the country seems immune but the disease is more prevalent in different regions of Baluchistan and KPK province. Various endemic foci have regularly been reported from different tribal agencies and other settled areas of Khyber Pakhtun Khwa (KPK) province like Kohat, Karak, Dir, Sawat, Timergara, etc.⁶⁻¹¹

During last couple of years, to tackle insurgency and terrorism, a large number of Army troops have moved to the areas of KPK province and FATA which are known endemic foci of CL. These troops (largely moved from central Punjab), being non-immune to CL are apparently at more risk of acquiring the disease as compared to native population. Present study was aimed to observe the prevalence and clinico-epidemiological pattern of the disease in these troops deployed in various regions of FATA and KPK province.

Patients and methods

All soldiers of either age from army units deployed at various locations in FATA and KPK province, reporting in skin outdoor from January 2010 to June 2010 with clinical diagnosis of CL (fulfilling the set diagnostic criteria) were

included in the study. Clinical diagnosis was based on (1) history of origin (history specifying the endemic area of residence at the time of development of symptoms), (2) morphology of the lesions (papule, nodule or plaque with or without secondary changes like crusting, ulceration), (3) character/behavior of the lesions (painless, non healing for few weeks / months) All registered patients were subjected to detailed clinical examination of the lesions taking into account the number of lesions, site, size, morphology and type of lesions. Slit skin smears were made from the active borders of the lesions to detect *Leishman-Donovan* (LD) bodies using standard technique.¹² Skin biopsy specimens were obtained by standard method, targeting the lesion edge. Specimens were then paraffin embedded and stained with hematoxylin and eosin to observe histopathological features. Final diagnosis was established on the basis of clinically suggestive lesion, positive slit smear and diagnostic or suggestive histopathology as defined by WHO.¹² Patients in whom clinical diagnosis was not supported by laboratory tests were excluded.

A self designed pro forma was sent to the medical officers attached with the army units inquiring about number of total troops in the unit, number of troops afflicted with the disease, geographical location of deployment and time since the patient had been in that specific region. They were also instructed to send all those individuals with CL, not registered with us so far. Clinical, epidemiological and laboratory data was recorded and finally analyzed by using computer software program "instat" Frequencies, descriptive analysis, and percentages were presented for the variables.

Results

Out of 172 initially enrolled cases, 2 were excluded from the study as their clinical diagnosis was not supported by laboratory findings. All patients were young males (armed forces personnel). Their ages ranged from 18 to 43 years (mean age was 27.4 years). Number of lesions ranged from 1-11 (mean=2.3). Multiple lesions were seen in 41.2% cases only. Size of lesions ranged from 1-13 cm (average 1.7 cm), 70.6% of lesions were seen on upper and lower limbs followed by head and neck region 27.6%, trunk and abdomen 1.8%. No lesion was seen on genitalia or scalp. Predominant morphological pattern seen was erythematous indurated plaques followed by crusted plaques, non healing ulcers, infiltrated nodules and papules. Apart from typical morphology, a few atypical variants like sporotrichoid (2), paronychia (2), chancriform lip lesions (2) and verrucous (1) were also seen. No other rare form like erysipeloid, eczematous, whitlow, lupoid or zosteriform was seen. Dry lesions constituted 57.6 %, while wet lesions were seen in 41.2% and recurrent scarring lesions in 1.2%. Skin slit smears were positive for LD bodies in 85 (50%) cases and skin biopsies revealed the diagnosis of CL in 161 (94.7%) cases. There were 9 cases (5.3%) in which no laboratory evidence of diagnosis was found and in such cases diagnosis was established on the basis of clinical features and desired therapeutic response. Majority of the cases were from the army units deployed in the areas in recent past (71.8%) as compared to (28.2%) native troops of frontier corps (FC).

Table 1 summarizes the demographic profile and clinic-epidemiological characteristics of soldiers diagnosed with CL and **Figures 1** and **2** show various clinical forms of the disease seen in study population.

Table 1 Demographic and clinic-epidemiological characteristics of study population

Number of patients	170
Age & sex	18-43 years, mean 27.4 years, all males
Geographical origin of patients (endemic areas from where the patients reported)	North Waziristan=70 South Waziristan=47 Kurram Agency/Parachinar=13 Mohmand Agency=2 Tall=25 Chitral=3 Swat/Dir =3 Bajur Agency=4 Bara/Khyber Agency=3
Type of study population	Newcomers to the area (deployed troops) = 122/4000 (3%) Native troops = 48/9000 (0.5%)
Sites of lesions	Hands & feet=34.5% Legs =14.7% Arms=21.4% Face= 27.6% Trunk= 1.8%
Clinical forms of the disease	Dry= 98 (57.6%) Wet= 70 (41.2%) Recurrent= 2 (1.2%)
Mean number of lesions per person	2.3
Mean diameter of largest lesion (cm)	1.7
Diagnostic methods used	Positive skin biopsies (diagnostic)= 161 (94.7%) Positive slit skin smears= 85 (50%) Clinical+therapeutic trial= 9 (5.3%)
Treatments used	Intramuscular meglumine antimoniate =21(12.3%) Intralesional meglumine antimoniate=149 (87.7%)

Discussion

CL represents a worldwide vector-borne parasitic disease with an important clinical and epidemiological diversity. The burden of the disease is ever increasing worldwide and it has become a severe public health problem in certain parts of the world.^{3,13,14} In Pakistan, CL is prevalent in various regions with different climatic and geographical conditions. It is highly endemic in the provinces of Baluchistan and of Khyber Pakhtunkhwa (KPK) while several outbreaks have also been reported from Sindh and Punjab.⁷⁻¹⁰ The disease has gained strategic importance worldwide as a lot number of patients of CL belonging to armed forces and UN peace keepers have been reported from various regions of the world.¹⁵⁻²⁰ The disease has also been described in significant number in Pakistan armed forces personnel deployed in

Baluchistan.²⁰⁻²¹ Development of CL in Armed forces personnel is due to the movement of non-immune soldiers into an endemic area as well as noncompliance with the precautionary measures.²¹ Recently, there has been movement of a large number of troops from non-endemic areas of central Punjab to endemic areas of KPK and FATA exposing the troops to increased risk of developing CL.

Our study population included all young male soldiers who were mostly involved in outdoor combat operations thus increasing their exposure to sand flies bites. Most of the affected patients came from North and South Waziristan agencies (117/170) while number of patient from other endemic areas of deployment like Kurram Agency, Khyber Agency, Bajur Agency, Mohmand Agency, Tall, Swat, Dir and Chitral were significantly less. This was due to the fact



Figure 1 A large crusted nodular plaque over nose before and after treatment with twice weekly intralesional injections of meglumine antimonate.



Figure 2 A primary ulcerated lesion on dorsum of hand with secondary sporotrichoid spread (wet type) before and after treatment daily intramuscular injections of meglumine antimonate.

that troops operating in North and South Waziristan were regular army units recently moved there from non-endemic regions of central Punjab, while in rest of operational areas, fighting troops mostly belonged to paramilitary personnel who were largely native to those endemic areas and therefore were relatively immune to the disease (due to phenomenon of 'herd immunity' prevailing in the community). CL was seen in 3% of regular troops (it was up to 9% in one of the Army units deployed in North Waziristan) while only 0.5% of paramilitary soldiers were affected. Mostly

affected parts of the body were extremities and exposed areas as seen in other studies.²⁰⁻²² Some rare clinical variants were also seen in our study but these have already been described in literature.^{22,23} Majority of the lesions (58%) fell in category of dry type lesions (usually caused by *L. tropica*). This finding was in contrast with previous study from Baluchistan where most common lesions were of wet type²² (usually caused by *L. major*) indicating that prevalent parasite strain in KPK and FATA is different from that in Baluchistan. Skin biopsies were the most yielding diagnostic methods followed by slit skin smear as seen in previous studies.^{24,25} There were only 5% of patients where clinical diagnosis was confirmed by therapeutic response to meglumine antimonate as neither skin slit smear nor histopathology was conclusive in these cases. We successfully treated large majority of patients (88%) with twice weekly intralesional injections of meglumine antimonate. Only patients with large multiple lesions (more than 5 in number) and having lesions in close proximity of bones and joints were treated with daily two ampoules of intramuscular injections of meglumine antimonate. On the basis of our findings, we suggest that non-immune soldiers deployed in endemic areas of CL should appropriately be educated before reporting to such areas to observe all preventive measures against sandfly bite so as to control the spread of the disease.

Conclusion

CL is common in soldiers serving in KPK province and FATA regions of Pakistan. Soldiers, recently, moved in these endemic areas for operations against terrorism from non-endemic areas of the country are at much higher risk of acquiring the disease as compared to the native troops. This risk can be decreased by implementing effective precautionary measures,

awareness programs and education of the soldiers before they are sent for deployment in endemic areas.

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