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A STUDY OF CUTANEOUS LEISHMANIASIS IN BALOCHISTAN, PAKISTAN: A FORGOTTEN DISEASE OF THE TROPICS

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Abstract: Fifty cases, Army soldiers, with cutaneous leishmaniasis were observed during a survey carried out (1995-96) by a joint team of Armed Forces Medical College and Defence Science and Technology Organization (DESTO) in different areas in the Province of Balochistan. Causes of prevalence as well as suggestive measures for prevention are also discussed.

Key words: Leishmania, protozoan parasite, gross pathology.

INTRODUCTION

Cutaneous leishmaniasis is endemic in more than 80 countries, notably those of South-West Asia (Desjeux, 1996). It attacks 400,000 new people every year and currently afflicts 12 million people in the world. It is the disease ignored as much by science as by the general public. Its victims are largely the rural poor population of the tropics and sub-tropics.

It is an important public-health problem for the Army personnels stationed in Baluchistan, Pakistan, in whom the disease often reaches the level of an epidemic. Its incidence is high in the winter and early spring, because this is the period when troops camp outside in the field, as a result the man vector-contact is augmented in zoonotic foci of the disease. Successful infection of a mammalian host by the human pathogen *Leishmania* involves the promastigote form inoculated by the sandfly vector of the subgenus *Phlebotomus* (Le Blancq *et al.*, 1986), invading a macrophage, transforming to the amastigote form and surviving against the microbicidal activity of the host cell.

Balochistan, the southwestern Province of Pakistan, is spread over an area of about 347,000 km^2 which comes to about 43.6% of the total land area of Pakistan. The whole province with the exception of a few areas, comprises arid zones with marked diurnal variation in temperature, dry barren rocks or sandy deserts. This province is famous for its arid character and lies outside the monsoon range. The province also faces extreme summer and winter temperatures. In summer it frequently touches 50°C in Kachhi, Turbat and Nokundi whereas in winter it falls down to -15°C in certain area of Kalat. The humidity level is generally low throughout the province. Rodents, canids, caprids, gazelles and various partridges are important animal groups inhabiting this province. Such animals do not spread the disease to humans, but do provide a reservoir of the

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parasite from which the sandfly draws the parasite. Leishmaniasis is one of those interesting conditions in which the lower animals play an important role as reservoir hosts. Cutaneous leishmaniasis locally called as "Quetta" or "Kandahar Kaldana" prevails over several areas in this province. Jan (1984) reported cases of leishmaniasis from local people and Afghan refugees residing in this province, belonging to very low socio-economic group of population, comprising males, females and children.

Much of the research concerning the epidemiology of leishmaniasis has been done in the former Soviet Central Asia (Kozevnikov, 1941; Latyshev and Krivkova, 1942). Nothing has been done uptil now on the epidemiology of this disease in Pakistan.

MATERIALS AND METHODS

This survey was conducted from September 1995 to February 1996 at Combined Military Hospital (CMH) Quetta and M.I. Rooms of Sibi, Maiwand, Kohlu, Lorali and Dera Bughti by a joint team of Armed Forces Medical College (AFMC) and Defence Science & Technology Organization (DESTO). Fifty cases of cutaneous leishmaniasis were examined. Data collected from patients were according to age, ethnic group type, number, location and duration of the lesions and the localities where infection was acquired. After taking a brief history, representative lesions were cleared with 70% alcohol. The diagnosis was parasitologically confirmed by amastigote - positive Giemsa/ Leishman stained smears from the lesions. Biopsy specimens collected by needle were inoculated into modified Tobie's medium (Evans *et al.*, 1984) or "NNN" medium in the laboratory. For culture studies, specimens incubated at 22°C for upto one month with periodic examination for promastigotes. 85% of the isolates aspirated from the patients' lesions became promastigotes-positive.

The leishmanin test was also done on the spot. Leishmanin is a suspension of 10^6 washed promastigotes of leishmania per ml of 0.5% phenol in saline. An intradermal injection of 0.1 ml on the volar surface of the fore arm is examined after 48-72 hours. Induration is measured by the "ball-point-pen" technique and recorded. A positive test indicates delayed hypersensitivity to leishmanial antigens.

OBSERVATIONS

Fifty cases of cutaneous leishmaniasis were examined in the winter months of the years 1995-96 (Table I). All were males belonging to different age-groups serving in Pakistan army admitted in the Combined Military Hospital, Quetta and M.I. Rooms of visited areas. Many of the patients had multiple lesions and the most common sites were forearms, hands and fingers of feet. By caste the patients were Punjabis and Pathans. Both age and caste factors were observed. The results are shown in Table II.

Caste-wise overall incidence was observed as 72% in Punjabi and 28% in Pathan groups (Table II).

Age was also considered as epidemiological factor, the results observed are given in Table II-A, showing that young people are more susceptible than older ones. The infection was found as 58% in younger group, 34% in middle group and 10% in older group of the patients.

Within each age-group (Table II-B) caste-wise infection was about 32% in Punjabis and 24% in Pathans in younger group, 30% in Punjabis and 4% in Pathans in middle group and 10% only in the elder group of Punjabis. None of them was local resident of this province. This shows that non-immune expatriates appear to be particularly at risk (Al-Gindan *et al.*, 1984).

Table I: Summary of 50 cases of cutaneous leishmaniasis

Sr. No.	Age (years)	Caste	Site of infection	Duration	Gross pathology
1.	45	Punjabi	Left wrist	1 year	Ulcer
2.	34	Pathan	Right forearm	1 year	Nodule
3.	32	Pathan	Both forearms	1 year	Ulcer
4.	36	Punjabi	Left forearm	8 months	Ulcer
5.	30	Pathan	Left forearm	9 months	Ulcer
6.	38	Punjabi	Forehead	9 months	Ulcerated nodules
7.	30	Punjabi	Right hand	9 months	Ulcerated nodules
8.	44	Punjabi	Toes of feet	1½ years	Ulcer
9.	21	Punjabi	Left iliac region	4 months	Plague
10.	40	Punjabi	Dorsum wrist	6 months	Ulcer
11.	42	Punjabi	Left small finger	2 years	Ulcer
12.	24	Punjabi	Cheek	6 months	Papule with crusting
13.	25	Punjabi	Right arm	4 months	Ulcer
14.	28	Punjabi	Left thigh	6 months	Ulcer
15.	25	Punjabi	Right ear lobe	6 months	Ulcer
16.	40	Punjabi	Left foot	1 year	Ulcer
17.	40	Punjabi	Right foot	1 year	Ulcer
18.	32	Punjabi	Right lower leg	1½ years	Ulcer
19.	28	Punjabi	Left upper arm	10 months	Ulcer
20.	13	Punjabi	Right hand	9 months	Ulcer
21.	30	Punjabi	Calf of left leg	9 months	Ulcer
22.	24	Pathan	Neck	8 months	Ulcer
23.	26	Punjabi	Left wrist	6 months	Ulcer
24.	33	Punjabi	Right arm	5 months	Ulcer
25.	26	Pathan	Left forearm	5 months	Ulcer
26.	27	Punjabi	Elbow	5 months	Ulcer

Continued on the next page

27.	27	Punjabi	Toes of left foot	4 months	Ulcer
28.	22	Pathan	Right hand	3 months	Ulcer
29.	26	Pathan	Toes of right foot	3 months	Ulcer
30.	25	Pathan	Left thumb	2 months	Ulcer
31.	26	Punjabi	Cheek	4 months	Ulcer
32.	24	Pathan	Left scapular region	3 months	Ulcer
33.	30	Pathan	Neck	1 year	Ulcer
34.	28	Pathan	Left wrist	1 year	Ulcer
35.	40	Punjabi	Right ear lobe	1½ years	Ulcer
36.	31	Punjabi	Elbow	2 years	Ulcer
37.	34	Punjabi	Right wrist	1 year	Ulcer
38.	40	Punjabi	Toes of right foot	1 year	Multiple ulcer
39.	42	Punjabi	Elbow	1 year	Single sore
40.	23	Pathan	Left upper arm	9 months	Ulcer
41.	32	Punjabi	Left thumb	7 months	Ulcer
42.	35	Punjabi	Neck	6 months	Ulcer
43.	26	Pathan	Forearm	5 months	Multiple ulcer
44.	26	Punjabi	Left hand	1 months	Ulcer
45.	25	Punjabi	Elbow	6 months	Ulcer
46.	22	Punjabi	Right arm	4 months	Ulcer
47.	24	Punjabi	Toes of right foot	4 months	Multiple ulcer
48.	22	Pathan	Both forearms	2 months	Multiple ulcer
49.	27	Pathan	Toes of both feet	6 months	Multiple ulcer
50.	31	Punjabi	Both forearm	2 months	Multiple ulcer

As far as survey of local people are concerned very little information exists. Jan (1984) examined about 100 patients including males, females and children both from local population and Afghan refugees. Out of 100 patients, 75 were children. Most of them had more than one lesion, most commonly on cheeks, nose, legs and hands. All of the patients belonged to a low socio-economic group.

Now the question is why it is more common in this Province of Pakistan? It needs investigation to elucidate parasitological, entomological and overall epidemiological studies in this Province. Bray (1974) reported that *L. major* is widely distributed across the old world in arid tropical and sub-tropical regions, accounting for much zoonotic cutaneous leishmaniasis (ZCL), although it is not only aetiological agent of old world ZCL. The factors which are responsible for the prevalence of this disease specially in this province are described below:

Agricultural activities are very little as most of the land is barren, arid or sandy providing suitable habitats for insects especially sandflies and other wild fauna acting as carriers, vectors or reservoirs for this as well as many other diseases.

Table II: **Showing age-wise and caste-wise incidence of cutaneous leishmaniasis observed in the Province of Balochistan**

A. Age-wise overall incidence:

	21-30 yrs	31-40 yrs	41 and above
Total number of patients	28	17	5
Percentage	56%	34%	10%

B. Caste and age-wise incidence:

	Punjabi (21-30 yrs)	Pathans (21-30 yrs)	Punjabi (31-40 yrs)	Pathans (31-40 yrs)	Punjabi (41 and above)	Pathans (41 and above)
Total No. of patients	16	12	15	2	5	-
Percentage	32%	24%	30%	4%	10%	-

C. Caste-wise overall incidence:

	Punjabi	Pathan
Total number of patients	36	14
Percentage	72%	28%

As this disease is very common in Afghanistan (Nadim *et al.*, 1979) and Iran, from both these countries, the free movement of refugees throughout Pakistan with their cattle, dogs and cats is responsible for spreading and exposure to leishmaniasis.

Most of the wildlife have also migrated from Afghanistan towards Pakistani areas near the boundary line which may be called not only the reservoir of leishmania but many other zoonotic diseases.

Rodent burrows provide ideal resting and breeding sites for sandflies (Naumov and Lobachev, 1975), since the internal microclimate is humid and stable in an otherwise arid environment. Thus, the sandfly vectors live in intimate association with these rodents that are potential host.

The situation of the Arabian Sea in the South of the Province has also facilitated the transmission of this disease from the Mediterranean and Middle East countries.

Health units as well as trained parasitologists are not available in this Province who can initiate research on this problem.

The medical doctors who hesitate to go and serve in the far flung areas of this Province are also responsible for this health problem.

Suggestive measures

a. The life cycle of leishmania involves an insect *i.e.*, sandflies of the genus *Phlebotomus*, serving as a vector, a rodents or canids serving as reservoirs or carriers and human beings as a final definitive host and hence representing a dreadful zoonotic problem which needs a detailed study on biological and epidemiological aspects of this disease. The basis of epidemiological studies must be adequate identification of the parasites.

b. Effective insecticide and rodenticide spray programmes should be started, keeping in view the side effect of these chemicals on wild fauna and flora. The spraying of such insecticides as DDT during anti-malaria campaigns also cuts down sandfly numbers. But the use of such chemicals against malaria has fallen off as mosquitoes grew resistant.

c. Mobile squads consisting of veterinary scientists, wildlife experts should patrol the natural habitats and the endemic areas for providing the health cover needed.

d. Dogs and cats positive for this parasite should be killed and buried in the ground. Chinese officials claim a programme of rounding up stray dogs and dissuading the population from keeping pets has eradicated the internal form which once menaced China.

e. A detailed programme should be initiated on zoonotic problems of this country at various R&D organizations. Soviet Union and Israel have elaborated a vaccine against particular species of leishmania; in our country planning would be done to develop an effective, standardized and safe vaccine producing long-lasting immunity against all types of leishmaniasis.

f. Public awareness should be created about all parasitic diseases by different mass media in the country and translated in all local languages.

REFERENCES

AL-GINDAN, Y., ABDUL-AZIZ, O. AND KUBBA, R., 1984. Cutaneous leishmaniasis in Al-Hassa, Saudi Arabia. *Internat. J. Dermatol.*, **23**: 194-197.

BRAY, R.S., 1974. Leishmania. *Ann. Rev. of Microbiol.*, **28**: 189-217.

DESJEUX, P., 1996. Cutaneous leishmaniasis: clinical aspects. In: *Clinics in dermatology* (eds. Y. Dowlati and F. Modabber), pp.417-423. Elsevier, New York.

EVANS, D.A., LANHAM, S.M., BALDWIN, C.I. AND PETERS, W., 1984. The isolation and isoenzyme characterization of *Leishmania braziliensis* subsp., from patients with

cutaneous leishmaniasis acquired in Belize. *Trans. Royal Soc. Trop. Med. Hyg.*, **78**: 34-42.

JAN, S.N., 1984. *Proc. Sci. Symp.*, held from May 23 - June 2nd, 1983, University of Baluchistan, Quetta, Pakistan, pp.52-63.

KOZEVNIKOV, P.V., 1941. *Proc. Symp. 1st Int. Repub. Conf. on Cutaneous Leishmaniasis and sandflies*. Ashkabad, Afghanistan, 127.

LATYSHEV, N.I. AND KRIVKOVA, A.P., 1942. *Medical Parasite*, Moscow, Vol.11, Nos. 1-2, p.74.

LE BLANCQ, S.M., SCHNUR, L.F. AND PETERS, W., 1986. *Leishmania* in the old world: 1. The geographical and hostal distribution of *Leishmania* major zymodemes. *Trans. Royal Soc. Trop. Med. Hyg.*, **80**: 99-112.

NADIM, A., JAVADIAN, E., NOUSHIN, N.K. AND NAYIL, A.K., 1979. Epidemiology of cutaneous leishmaniasis in Afghanistan. Part-2. Anthroponotic cutaneous leishmaniasis. *Bull. Soc. Path. Exot.*, **72**: 461-466.

NAUMOV, N.P. AND LOBACHEV, V.S., 1975. Ecology of the desert rodents of the USSR. In: *Rodents in Desert Environment* (eds. I. Prakash and P.K. Ghosh), pp.465-598. The Haig: Dr. W. Junk.

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