CUTANEOUS LEISHMANIASIS IN BALUCHISTAN : RESERVOIR HOST AND SANDFLY VECTOR IN UThAL, LASBELLA.

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Abstract

The incidence and prevalence of Cutaneous Leishmaniasis, sandfly vector and rodent reservoir species, were studied in Uthal, South Baluchistan. Four hundred and eighteen school children (5 16 years of age) were examined. Five (1. 1 %) had active lesions and lit (26.5 %) had scars resulting from past infection of Cutaneous Leishmaniasis. A total of 432 sandf lies were collected from the rodent burrows by placing 157 sticky traps at six different places. disease is caused by the bite of an infected
Two species of Phiebotomus and four species of Sergentomyia group of sandf lies were identified. Ten of the eleven rodents trapped alive belonged to the Meriones Spp. and the remaining identified as Tatera indica. Smears prepared from the ears of the animals were positive for amastigotes in one (Tatera indica). Sections of liver and spleen from all eleven rodents failed to reveal amastigotes. (JPMA 36: 134,1986).

INTRODUCTION

Cutaneous Leishinaniasis or oriental sore is a very ancient disease affecting millions of people throughout the old world. Among the most ancient medical documents that perhaps refer to this condition is “Ebers Papyrus” in Egypt which date6 back to 2000 years BC[1]. This disease has been known to occur in Baluchistan since long, and the epidemiological pattern appears to be similar to the one seen in the neighbouring areas of Iran, Afghanistan and Rajasthan in India. The disease is caused by the bite of aninfactedsandfly producing chronic ulcers usually on the exposed parts of the body. These ulcers generally have a tendency for self healing. Both Anthroponotic Cutaneous Leishmaniasis (Urban or Dry type as well as Zoonotic Cutaneous Leishmaniasis (Rural or Wet type) occur in the region although the latter is more prevalent.[2,3]
The disease is endemic in this area and local population have acquired immunity against it. The infection, therefore, manifests it-self mainly in young children and nonimmune adults. The region is undergoing rapid industrialisation as a result of which large number of nonimmune workers migrate into the area and the disease sometimes assumes epidemic proportions in such groups. This report discusses the incidence and prevalence of Cutaneous Leishnianiasis among the indigenous population, the sandflies found in the region and possible rodent reservoir(s) of the disease.

MATERIALS AND METHODS

Population Studies:

The area selected for the study was Uthal, district Lesbella, about 120 Km, North West of Karachi. It has a population of over 10,000 with an annual rate of increase of about 4.5%. (According to census in 1981, the population of Uthal was 9404. Rate of increase, 4.5%). The locations surveyed included the District Headquarter Hospital, out patients department of PakIran textile mill, three primary and a high

school for boys. School children (aged five to sixteen years) were examined for active lesions and scars resulting from the disease. Careful history regarding the development of scars was obtained and those due to conditions other than Leishmaniasis such as trauma, burns, etc. were excluded.

Collection of Sandflies:

Sandflies were collected with the help of sticky traps made of sheets of paper measuring 20cm x 15 cm and coated with Caster oil. These were stapled to pags and stuck on the ground surface in front of rodent burrows.[4] One hundred and fifty seven sticky traps were placed at six different places, half to one hour before sunset and collected similarly half to one hour after sunrise. Sandflies caught were placed on moist filter paper in petri-dishes and kept cool. Indentification of sandflies was carried out and blood fed or gravid females were dissected for evidence of promastigotes using both dissecting and a light microscope.

Collection and examination of Rodents:

Rodents were caught in locally made traps with spring operated doors. These were placed amidst active colonies of rodent burrows and were kept in position overnight, in the morning hour and late afternoon for four days. Pieces of cheese, cuccumber and bread smeared with local butter were used as bait. The animals caught were kept in position overnight, in the morning hour and late afternoon for four days. Pieces of cheese, cuccumber and bread smeared with local butter were used as bait. The animals caught were examined for sores and scars. Giemsa touched preparations from ears, liver and spleen were examined. In addition formalin fixed preparations of these tissues were also examined histologically after H&E staining.

RESULTS

The survey showed that in District Head Headquarter Hospital about 100 150 patients are examined daily and about 300 \ 350 patients are examined per week in the out patient dispensary of Pak- Iran textile mills. The incidence ‘of Cutaneous Leishmaniasis in both these places was approximately 1%. School survey revealed that a total of five out of 418 schools children examined had active lesions (1.1%) and III had scars resulting from Leishmania ulcer, four of the five children with active lesion were from the younger age group of 5 10 years (Table I).

TABLE - I

Prevalence of Cutaneous Leishmaniasis among School Children in Uthal (Oct: 1985).

Age group	Total Number	With scar No.(%)	With active lesion No.(%)
5 – 10	220	63 (28.6%)	4 (1.8%)
11 – 16	198	48 (24.2%)	1 (0.5%)
Total	418	111 (26.2%)	5 (1.1%)

All students examined were males.

All stqdents examined were males.
A total of 432 sandflies were collected from the rodent burrows. Of these 237 belonged to the Phiebotomus group and the remaining to the Sergentomyfa group. Two hundred twelve were identified as Ph. papatasi (49.07 %) and 15 as Ph. salehi (34 %). 4mong the Sergentomyia sandflies, 178 S. clydei were trapped (41.2%) (Table II).

TABLE - II
Sandflies collected from Rodent Burrows in Uthal (Oct; 1985).

Species	Number of collected			Average per sticky trap	Percentage of sand flies collected
	Total	Male	Female		
Ph. papatasi	212	178	34	1.35	49.07
Ph. Salehi	15	9	6	0.09	3.47
S. africana	3	1	2	0.01	0.69
S. clydei	178	139	39	1.13	41.20
S. dentata	23	7	16	0.14	5.32
S. squamipleuris	1	–	1	0.01	0.23

Ph= Phlebotomus

Seven blood fed and gravid female sandflies (five Ph. papatasi and two S. clydei), were dissected for promastigote infection but no flagellates were found.
Live traps were placed at nine places and eleven rodents were collected. Nine of these were Meriones hurrianae. Except for Tatera indica which showed parasites in smears prepared from the edges of its

healthy ears all the rodents were free from clinical infection (Table III and IV).

TABLE-III

Rodents collected in Uthal (Oct; 1985).

Locality	Number of traps/night	M. hurrianae	Tatera indica
Uthal	86	1	–
Arvi	28	1	–
Jovgir	61	8*	1
Total	176	10	1

* One rodent belonged to Meriones group but the exact species remained unidentified.

TABLE–IV

Results of Investigations on Rodents.

Species	Number collected	Number positive (Parasitologically)
Meriones hurrianae	9	0
Meriones (Spp. unidentified)	1	0
Tatera indica	1	1
Total	11	1

Touch preparations from the spleen and liver as well as their histological sections were negative for aniastigotes in all.

DISCUSSION

The present study revealed that incidence of disease in the patients attending hospitals in Uthal area is around 1 % of all cases. The prevalence of active Cutaneous Leishmaniasis in school children was 1.1% (five out of 438 children). However, in the younger age group (5-10 years) there were more cases of Leishmania ulcers (four out of 220 approximately 2 %), as compared to the children of older age group there was only one case out of 198 children examined. This child was the son of an expatriate government worker and had migrated into the school about 10 months before. The number of children who had been exposed the disease as evidenced by scars did not show any striking difference (24% and 28% respectively). Furthermore, four non local adults with active lesions were seen. These ulcers in all cases were multiple involving face, neck, fore-arm especially around the wrist and hand. Clinically, as well as from history these were assessed to be of wet (Rural or Zoonotic) types of lesions.

It has been reported that there are at least different species of sandflies in Pakistan[5]. Ten of these species belong to genera Phiebotomus and fifteen to the genera Sergentomyla. In our collection of sandflies from rodent burrows, we found two species of Phiebotomus and four species of Sergentomyla group. Ph. papatasi was the most predominent species found (49.1%). Not a single Ph. sergenti was trapped. This sandfly does not appear to be a major vector for the disease in South Baluchistan.[3] It however, is commonly found in other areas of the country as well as in Iran, Middle East, parts of Mediterannein basin and North Africa where it transmits urban or dry type of Cutaneous Leishmaniasis[6].

We identified fifteen (3.5%) Ph. salehi (Nine males and six females). This sandfly has been found for the first time in Pakistan and is a known vector of the disease in neighbouring Iran[7] as well as Rajasthan in India.[8] The Sergentomyia sandifies do not transmit human disease, but are a vector for Uzard and Avian Leish. maniasis. S. clydei (41%) was found to be the most predominent species in this group of sand. flies. We failed to find any promastigotes in the seven blood fed and gravid sandflies collected. Sticky papers used in our study are perhaps not a very useful technique for parasite isolation and live traps for catching sandflies yield better results. The number of infected sandflies varies throughout the season. At the beginning when all flies examined are nulliparous, no infected females are found. Even at the peak of the population density, when flies are numerous it is often difficult to find infected flies, the reason is that the peak is a reflection of massive emergence of young files which again cannot be infected if they have never taken a blood meal. The best time to find infected sandflies is, therefore, when the population is falling towards the end of the season. At this time the proportion of parous females is highest and since they must have taken atleast one blood meal, the chances of finding infected specimens are ideal[9]. It would be useful to conduct a study on breeding habits and bionomics of sandflies in Baluchistan.

Anthrotonotic (Urban or Dry type) Cutaneous Leishmaniasis is caused by L. tropica. Transmission cycle is generally man-sandfly-man, although in some countries dogs and rats (Rattus rattus) have been found to be infected with this parasite and these may be serving as a reservoir host. Zoonotic (Rural or Wet type) Cutaneous Leishmaniasis on the other hand is mainly a zoonosis. Transmission of infection i.e. rodent-sand-files-rodent cycle is maintained in wild rodent! gerbil colonies as sandflies breed in abundance in the cool and shady burrows. Rhombomys opimus, Mariones spp. and Psammomys obesus are the three major reservoir species of the rodents that maintain infection in most of Central Asia, Middle East and North Africa.[10] Others that are implicated in various parts of the old world include Mastomys spp., and Xerus spp. A host of rodent species are reported from Baluchistan and include Meriones hurrianae, Mariones crassus, Meriones lybicus, Meriones persicus, Mus musculls and Rhombomys opimus[3] . There is however no information available regarding confirmed reservoir. We

indentified nine Meriones hurrianae, one Meriones (species unidentified) and one Tatera indica. These animals show a diurnal activity being active during the cool hours of morning and late afternoon. Although none of the animals trapped demonstrated any clinical evidence of disease, nevertheless smears prepared after scrap-. ping the animals ears revealed amastigotes in atleast one (Tatera indica). Natural infection in rodents without clinically apparent cutaneous lesions have been reported previously. [11]

We conclude that although amastigdtes were demonstrated from the ears of Tatera indica, it does not imply that this rodent is the main reservoir of disease in this area. We believe that Meriones hurrianae is perhaps the main reservoir and the epidemiology of the disease in this focus is similar to the foci in India[8], and Chah Bahar in Baluchistan, Iran[7]. Further epidemiological studies need to be carried out to implicate the reservoir host and the vector of the disease. Natural infections in rodents can perhaps best be demonstrated by finding Leishmania antibodies in their blood using Indirect Immunofluorescence technique[12]. Collaboration in epidemiological studies with neighbouring countries should be sought before embarking upon preventive measures aimed at reducing disease transmission in this region.

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