Original Article

Pathology

Prevalence of Cutaneous Leishmaniasis in urban and semi-urban areas of Karachi

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ABSTRACT

Background: Cutaneous leishmaniasis (CL) occurs sporadically in many parts of Pakistan throughout the year. The etiologic agent is a haemoflagellate parasite of the genus Leishmania. The disease was once endemic in Balochistan but now has become highly prevalent in many cities of Sindh, including Karachi.

Objective: To observe the frequency of cutaneous leishmaniasis in patients belonging to urban and semi-urban areas of Karachi, attending the Dermatology Department of Jinnah Postgraduate Medical Centre (JPMC), Karachi.

Study Design: Cross-sectional study.

Place and Duration of Study: This study was conducted in the Department of Microbiology at Basic Medical Sciences Institute (BMSI), Karachi, from November 2003 to April 2004.

Subjects and Methods: The cases from urban and semi-urban areas of Karachi diagnosed provisionally on clinical grounds were sent by the out-patient department of dermatology of JPMC to Microbiology Department of BMSI, JPMC. The affected skin wounds were cleaned by the alcohol (spirit) swab. The smear prepared from the skin ulcer tissues were stained with Field Stain A and B for microscopic examination to confirm the diagnosis by observing amastigotes (Leishmania donovani bodies).

Results: A total of 42 provisionally diagnosed cases of Cutaneous Leishmaniasis on clinical ground were examined. Out of these, 29 were confirmed to be suffering from cutaneous leishmaniasis by observing the presence of amastigotes using microscopic examination. The remaining 13 cases were also diagnosed as cutaneous leishmaniasis on the basis of clinical appearance and response to treatment. The total number of cases from urban areas was eight, and from semi urban areas, the number of cases was 34. The patients attended the hospital belonged to following thirteen urban and semi-urban areas of Karachi: Afghan Basti 10 (23.80), Suhrab Goth 5 (11.90), Mango Pir 4 (9.52), Godap Town 4 (9.52), Sachal Goth 3 (7.14), Surjani Town 3 (7.14), Chakiwara 3 (7.14), Hub River Road 3 (7.14), Outside Karachi 2 (4.76), Maripur 2 (4.76), Manzoor colony 1 (2.38), Kashmir Colony 1 (2.38), Ayoub Goth 1 (2.38). The male-to-female gender ratio from urban areas, 6 (14.28%) were male and 2 (4.76%) were females; and from semi-urban area 23 (54.76%) were males and 11 (26.20) were females.

Conclusion: Cutaneous leishmaniasis is endemic in urban and semi-urban areas of Karachi causing morbidity and significant social and economic burden. The risk can be decreased by implementing effective precautionary measures and public education.

Key Words: Amastigotes (Leishmania donovani bodies), Cutaneous Leishmaniasis, Sand fly..

INTRODUCTION

Cutaneous Leishmaniasis (CL) is a chronic granulomatous disease that belongs to a spectrum of diseases produced by intracellular protozoal parasites of genus Leishmania. Leishmaniasis can have three distinct presentations depending on species and host immune-response namely visceral, cutaneous, and mucocutaneous. About 21 species of Leishmania have been described in literature.(1) It is transmitted by sandflies as vectors, the species, *Phlebotomus*, *Lutzomyia* and *Sergentomyia* affect vertebrates, but only the former two transmit disease to humans.(2) Approximately, more than 90 percent of the world's cases of leishmaniasis are in India, Bangladesh, Nepal, Sudan, and Brazil where *Phlebotomus* genus of sandflies is the major vector of such infections. (3)

Cutaneous Leishmaniasis is a serious public health problem with a wide range of clinical symptoms being prevalent in more than 88 countries, and carries a significant morbidity potential. Cutaneous leishmaniasis is endemic in the tropics and neotropics.(4) Endemic areas include Argentina, USA, Middle East, India, Pakistan, Iran and North & East Africa.(5) It mainly affects low-income people or rural and suburban populations. (6)

Leishmaniasis has been divided into 'New World' and 'Old World' based on its geographical epidemiology and causative species. New world refers to the infection by the species found in Mexico, Central and South America. Old world meansthe disease caused by species found in the Mediterranean basin, the Middle East, South Asia and Africa. Sandflies biting a human host inject flagellated morphological form of the

parasite, promastigotes, which survive ingestion by macrophages where they become non-flagellated forms amastigoes, multiplying intracellularly.(3, 7)

CL is characterized by chronic granulomatous scarring lesions at the site of the bite, with satellite lesions, local lymphadenopathy and it can progress to mucocutaneous and visceral forms of leishmaniasis. (4) . CL has been given an assortment of names in different geographical locations,such as "Dehli Boil" in India," Baghdad Boil" in Iraq and "Saldana" in Afghanistan.(8)

Visceral disease carries significant mortality and morbidity. Cytokines released by macrophages gives rise to fever, emaciation and bone marrow is invaded by parasites so the patient becomes anaemic, leucopenic, thrombocytopenic and predisposed to secondary bacterial infections.(9, 10)

Untreated patients will worsen and die within a period of 2 years. Because of increasing trend in the dissemination of leishmaniasis in both urban and semi-urban areas, and the risk of developing disfiguring or widesped disease, the aim of our study was to observe the prevalence of leishmaniasis in our local population of Karachi and its suburbs.

SUBJECTS AND METHODS

The provisionally diagnosed cases of Cutaneous Leishmaniasis on clinical grounds, attending from urban and semi-urban areas of Karachi, were referred by the out-patient department of dermatology of JPMC to microbiology department, BMSI, JPMC**. A** self-designed proforma was made for the patients showing, age, sex, gender, marital status, address and history of travel to endemic area was noted.

Cutaneous scraping was carried out after proper cleaning and drying of the lesion using alcohol swabs. To carry out a tissue scraping, the lesions were disinfected, any eschars or exudates were removed. 1% lidocaine was used to reduce bleeding, enhance debridement, and acquire and recover tissue scraping quality.(11) For tissue scrapings, a no. 10 or no. 15 scalpel blade may be scraped along the base of an active ulcer. Scraping should be performed with a pressure that is adequate to obtain exudates, without eliciting bleeding.(11) On a glass slide, a circular motion should be used to spread the dermal tissue in a 2–3-cm diameter.(12) The slide can be fixed briefly with methanol, Field stained, and examined for the presence of amastigotes.

Five smears for microscopic examination were made from the ulcer site. Scrapings are made from the center and the margin of the ulcer taking into account older lesions (more than four months) has fewer parasites than newer ones.

Thin smears were subsequently made on a clean glass slide from the sediment containing the parasites. The smears were air-dried and then stained with modified Field's stain (house-made).

The slides were subsequently air-dried and the stained slides were examined under oil immersion (x100) microscopy to confirm the diagnosis by observing amastigotes. (Leishmania donovani bodies). The smears were examined completely to confirm negative samples.

RESULTS

A total of 42 provisionally diagnosed cases of cutaneous Leishmaniasis on clinical ground were examined. Out of these, 29 were confirmed to be suffering from cutaneous leishmaniasis by observing the presence of amastigotes using microscopic examination. The total number of cases from urban areas were eight, and from semi urban areas, 34 cases were confirmed. The patients attended the hospital belonged to following thirteen urban and semi-urban areas of Karachi: Afghan Basti 10 (23.80), Suhrab Goth 5 (11.90), Mango Pir 4 (9.52), Godap Town 4 (9.52), Sachal Goth 3 (7.14), Surjani Town 3 (7.14), Chakiwara 3 (7.14), Hub River Road 3 (7.14), Outside Karachi 2 (4.76), Maripur 2 (4.76), Manzoor colony 1 (2.38), Kashmir Colony 1 (2.38), Ayoub Goth 1 (2.38) (Table 1).

The male-to-female gender ratio from urban areas, 6 (14.28%) were male and 2 (4.76%) were females; and from semi-urban area 23 (54.76%) were males and 11 (26.20) were females (Table 2).The result of microscopy showed positive amastigote identification in 29 (46.03%) cases (Table 3).

From wet type of 28 (66.67%) lesions, 19 (45.23) cases were amastigote-positive, and 9 (21.42%) cases were amastigote-negative. From 14 (33.34%) dry type of lesions, 10 (23.80%) were -positive and4 (9.52) gave negative results. (Table 3).

Table No.1: Patients from Urban and Semi-Urban areas of Karachi where from patient came to Skin OPD of JPMC

Sr.No.	Areas of Karachi	No. of cases	% of cases
1.	Afghan Basti	10	(23.80)
2.	Suhrab Goth	5	(11.90)
3.	Sachal Goth	3	(7.14)
4.	Surjani Town	3	(7.14)
5.	Godap Town	4	(9.52)
6.	Maripur	2	(4.77)
7.	Hub River Road	3	(7.14)
8.	Manzoor colony	1	(2.39)
9.	Kashmir Colony	1	(2.39)
10.	Ayoub Goth	1	(2.39)
11.	Chaki wara	3	(7.14)
12.	Mango Pir	4	(9.52)
13.	Outside Karachi	2	(4.76)
Total	13	42	(100)

Table No.2: Number of Male and Female Patients from Urban and Semi-Urban areas

Sex of Patients	Urban area	Semi-Urban area	Total number of Patients
Male	6 (14.28)	23 (54.76%)	29 (69.04)
Female	2 (4.76%)	11 (26.20)	13(30.96%)
Total	8 (19.04%)	34 (80.96%)	42 (100%)

Table No.3: The result of Microscopy

Type of lesion	Amastigote positive %	Amastigote negative %
Wet type of lesion %	19 (45.23)	9 (21.42)
Dry type of lesion %	10 (23.80)	4 (9.52)
Total %	29 (69.04)	13 (30.95)

DISCUSSION

It is estimated that globally, 1.5-2 million new cases of CL and 70,000 deaths occur each year, and 350 million people are at risk of infection and disease. In endemic countries, diagnosis is often made clinically and, if possible, by microscopic examination of lesion biopsy smears to visually confirm leishmania parasites as the cause.(4) The burden of the disease is escalating worldwide and it has become a severe public health problem in certain parts of the world[13,14,15].

In Pakistan, CL is prevalent in many parts with different climatic and geographical conditions.(2) In the last decade, the disease disseminated to the central and southern parts of the country, central Punjab and Sindh provinces.[16]

Karachi is the largest city of Sindh province and Pakistan, located on the coast of the Arabian Sea. It has mangroves and swamps which are good breeding environment for the vector female sandflies. Sandflies mostly breed in salt marshes, and the larvae pupate on floating debris.[17]

As an aftermath, of war in Afghanistan (which is part of the Leishmaniasis belt in Asia), the mass-migration of Afghan refugees into Pakistan led to introduction of this skin disease. This high prevalence of CL in the local population may be due to the low immunity towards this pathogen as they have not encountered it previously while in Afgghanistan this disease is endemic since centuries (17) The hilly areas of the Larkana district i.e., Warah, Kamber and Shahdad Kot talukas, bordering Baluchistan and Khirthir mountains range became target of the disease from February 2001 onwards.(18) Not enough work has been done about frequency of cutaneous Leishmaniasis in Pakistan. In a study, from North West Frontier Province (NWFP) by Zubair Khan showed CL 60% cases in rural areas and 40% cases in urban areas.(19)

In a study carried out by Durrani et al,(20) on the prevalence of sandflies during May 2007 to June 2008 covering all four seasons, seventy eight out of the hundred and twenty flies (65%), carried the infective leptomonad forms of leishmania promatigoes in their salivary glands and foreguts. They also reported highest prevalence of leishmania carrying sandflies in the south of Pakistan. In a study from Peshawar by Sami Ullah Khan showed a frequency of 45% cases.(21)

In Karachi, our study showed CL cases in semi-urban at the frequency of 34 (80.96%), and in urban areas 8 (19.04%).The leading area was Afghan Basti, where 10 (23.80) cases were positive, here mostly the refugees from Afghanistan are residing and the hygienic conditions were very poor, which facilitate the growth of sandflies and other arthropod vectors.

The second number highest number was from Suhrab Goth where 5 cases occurred. Then from Mango Pir and Gudop town four, cases occurred. These results indicate that the frequency of the disease has increased; along with this we have also detected the cases of CL from different parts of urban and semi-urban areas of Karachi. This high prevalence might be due to the fact that the sand fly lives in crannies in mud huts, and a contributing factor may be the coexistence of domestic animals, which offer ready nourishment to the flies. (22-24)

CONCLUSION

This study shows that cutaneous leishmaniasis is becoming endemic and increasing in Karachi and its surrounding areas. There are various factors interplaying in its epidemiology, including the vector and host immunity interactions. CL causes widespread disfiguring lesions which can become the root of other morbidities. This problem can be decreased by implementing precautionary measures including improvement of hygienic conditions and public awareness programs.

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