# *Bacterial Infections Associated with Cutaneous Leishmaniasis*

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## Abstract

Background:Oriental sore occurs mostly in the mediteranian region , North Africa ,and the Middle East . Rodents are the main reservoir for the parasite . The wet type caused by *L. major* is rural and the dry type caused by *L. tropica* is urban and humans are presumably the only reservoir. Sand fly vectors are involved in all forms.

Objectives: This study aimed to show the most important bacterial infections concomitant with cutaneous leishmaniasis .

Methods; The study was performed on 75 patients (ages 1-50 years ) from both sexes were attending Skin Diseases Department of Ramadi General Hospital during the period extended from January to June 2000. These patients were clinically diagnosed as patients with cutaneous leishmaniasis. Skin specimens were taken for bacteriological and parasitological investigations .The same thing was done for specimens from 25 intact individuals resembling the test group as negative controls.

**Results:** Children showed more lesions with Positive cutaneous leishmaniasis, adult females, showed more l lesions than adult males. Children showed more bacterial isolates than adults, from both positive and negative l lesions. Staphylococcal and Streptococcal isolates took the first rank of isolation in all age groups and both sexes. *E. coli* and fecal Streptococci were isolated from children only.

**Conclusion:** Bacterial invasion for the skin lesion with cutaneous leishmaniasis complicates the lesion and leads to misdiagnosis, in addition to the delay of healing of the lesion via bacterial end-products. There is a need for accurate diagnostic techniques like polymerase chain reaction (PCR) for both bacterial and parasitic agents, suitable effective antimicrobial therapy, in addition to the antileishmanial agents. Good sanitation of the lesion and community education to prevent infections.

**Keywords:** Bacteria and Leishmania, Bacterial skin infection, L concomitant infections.

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## Introduction

Cutaneous leishmaniasis is an important protozoal disease transmitted by sand fly, it is endemic cross the desert of the Middle east to Afghanistan and Africa. [1,2,3]

In Iraq, cutaneous leishmaniasis is endemic and was known since ancient decades and locally was known as Baghdad boil. [4,5,6] Incidence rate was increased later due to the embargo imposed in1990 on Iraq [3].

Bacterial infections may increase severity of skin lesions and it may cause misleading to diagnosis. [7,8] This study was done to show the most important bacterial infections associated with coetaneous leishmaniasis.

## Methods

Seventy five patients with clinically diagnosed skin leishmaniasis from both sexes and different ages) 1-50)years old were included in this study. They were attending Ramadi General Hospital during the period extended from January to June 2000. Twenty five intact individuals without any skin lesions from both sexes and the same age groups were included in the study as negative control. Specimens were taken aseptically for direct and indirect parasitological and bacteriological investigations following WHO [9], guidelines as mentioned bellow:

**Specimens for Parasitological Identification:**

Skin lesion and surrounding area were cleaned with cotton moistened with isopropyl alcohol 70% , the indurated edge of the lesion was scratched using sterile lancet and tow smears for parasitological direct examination were prepared and stained with Geimsa stain. The smears were screened for the amastigote under light microscope using oil immersion lens. [7]

**Specimens for Bacteriological Investigations:**

Immediately after the parasitological scratching samples, scratched area and the apex of the lesion were scraped using sterile swab moistened in sterile normal saline. These specimens were submitted for direct and indirect bacteriological investigations-following Finegold *et al* [10]. The following culture media were employed for the cultivation. of the specimens:

-Blood a gar for aerobic and anaerobic cultivation.
- MacConkey's agar ( Oxoid)
- Special recommended Media on need
-Biochemical tests Media for Microbial identification:
- Api- staph ( Biomereiux-Spain)

**Statistic Analysis:**

Data were analyzed using Chi-square test as mentioned by Daniel [1]

## Results

Age and sex distribution of patients and control individuals were shown in **Table-1** Only adult females showed significant differences in their number ($P< 0.05$).

Children showed more numbers of positive l lesions (L+) than adults ($P> 0.05$).The majority of Leishmania positive lesions were moist **Table- 2**.

Children showed more bacterial isolates than adults in both leishmania positive and negative lesions ($P< 0.05$) **Table-3** Staphylococcus species and Streptococci showed the first rank of isolation in both age groups and sexes. ($P < 0.05$) in lesions containing L amastigotes (L+) and lesions free of it (L-) table- **3**.

E.coli and fecal Streptococci were isolated from children bellow five years especially fro lesions on the lower limb , while Klebsiella and Pseudomonas species were isolated from adults only who were complaining from of wet lesions primarily .

Although Diphtheroides reside skin normally, they were isolated from wet lesions with positive Leishmaniasis. Mixed bacterial infections were found in both positive and negative l lesions mostly in children **Table-4**.Anaerobic bacteria were not detected. One isolate of each Streptococcus pyogenes and Staphylococcus aureus were isolated from normal male children, the same organisms were detected in normal adult females **Table- 3**.

## Discussion

Higher number of positive L lesion(L+) in children might be attributed to the high exposure of children to infection than adults via their difference in dressing and habits in addition to the immune status [12,13]. This was not in accordance with the observations of Eddresisn et al [7]. Increased L infections in adult females were due to the nature of the female dressing and cosmetic behavior of them which makes them more exposed to insect bites. Majority of L+ lesions were moist , this was due to exudates induced by the parasite and secondary infection facilitated by local immune suppression [13,14]. Absence of amastigotes from some lesions might be due to previous treatment of these patients with anti-l drugs . as well as the disintegration and masking of amastigotes due to heavy bacterial infections. Higher bacterial infections observed in children were attributed to the more exposure of children to infection in bad hygiene.

First rank of isolation for *Streptococci* and *Staphylococci* in both age groups and both sexes was in accordance with the observations of Al-Barazangi [6], Edrissian et al [7], Mandell et al [15].

This was due to the ability of the organisms to infect skin tissues especially damaged type [15, 16, and 17].

Isolation of fecal streptococci was not reported previously [6, 7]. Isolation of such organisms indicates more probable contamination of the lesions particularly those on the lower limbs with fecal contents in these children. The same thing was accepted for *E.coli* and mixed bacterial infections.

In spite of the normal presence of Diphtheroides on skin, their isolation from some lesions might be due to local immune suppression at the sites of infection , thus such weak sites become invaded easily by opportunistic pathogens [16]. Isolation of Streptococci and *Staphylococci* from some normal individuals was attributed to asymptomatic carriage of these organisms by these individuals as well as bad hygiene of them [13].

Failure of anaerobic bacterial isolation from patients and controls was in accordance with Eddression *et al* [7]; this might be due to the un optimal anaerobiasis in skin lesions due to:

- Aeration of the skin lesions.
- Release of certain enzymes (catalase , dismutase ) by aerobic organisms reside skin lesions [13].

In conclusion, bacterial infection of the skin lesions of cutaneous leishmaniasis complicates lesions and leads to the misdiagnosis of the parasite as well as delay healing of the lesion. So there is a real need to suitable antibiotic therapy and good sanitation of the skin in addition to the antileishmanial therapy.

More accurate diagnostic techniques for the parasitic and bacterial agents are needed such as polymerase Chain Reaction. Effective methods for the eradication of the vector as well as community education and personal hygiene improvement should be done especially for children to reduce infection.

*(Table-1)*

*Distribution of Patients and Controls According To Age and Sex*

| Age group (years) | Patients Male | Female | Total | Control Male | Female | Total |
|---|---|---|---|---|---|---|
| 1-15 | 21 | 19 | 40 | 6 | 6 | 12 |
| 16-50 | 15 | 20 | 35 | 6 | 7 | 13 |
| Total | 36 | 39 | 75 | 12 | 13 | 25 |

*(Table 2)*
*Age and Sex Distribution of Positive L Lesion (L+) and Negative Lesion (L-)In Patients*

| **Age group (year)** | **L+** | | **L-** | | **Total** |
|---|---|---|---|---|---|
| | **Male** | **Female** | **Male** | **Female** | |
| (1-15) | 13 | 15 | 8 | 4 | 40 |
| | W D W D W D W D | | | | |
| | 9 4 10 5 | | 5 3 | 2 2 | |
| (16-50) | 6 | 12 | 9 | 8 | 35 |
| | W D W D W D W D | | | | |
| | 4 2 8 4 | | 6 3 | 5 3 | |
| Total | 19 | 27 | 17 | 12 | 75 |

D =Dry lesion
W =Wet lesion

*(Table 3)*
*Distribution of Bacterial Isolate in the Studied Individuals*

| Type of bacterial isolate | L+ | | | | L- | | | | Total | Control | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 1 | | 2 | | | 1 | | 2 | |
| | M | F | M | F | M | F | M | F | | M | F | M | F |
| S.pyogenes | 3 | 2 | – | 1 | 1 | 2 | 1 | 1 | 11 | 1 | | 1 | |
| S.fecalis | 3 | 4 | – | – | 1 | 1 | – | – | 9 | | | | |
| S.aureus | 4 | 3 | 1 | 1 | 3 | 2 | 2 | 2 | 18 | 1 | | 1 | |
| S.epidermedis | 1 | 1 | 1 | – | 1 | – | – | – | 4 | | | | |
| E.coli | 2 | 3 | – | – | 1 | 1 | – | – | 7 | | | | |
| K.pneumoniae | – | – | 1 | 2 | — | — | – | 1 | 4 | | | | |
| P.aeruginosa | – | – | 1 | – | — | — | – | — | 1 | | | | |
| Diphtheroids. | – | – | 1 | 1 | — | — | 1 | – | 3 | | | | |

1=Age group (1-15) years. L+: leishmania positive lesion.
2=Age group (16-50)years. L:- leishmania negative lesion.

*(Table 4 )*

*Mixed Infections of Bacterial Isolates in the Studied Individuals*

| Mixed bacterial Isolates | L+ | | | | L- | | | | Total | Control | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 2 | | 1 | | 2 | | | 1 | | 2 | |
| | M | F | M | F | M | F | M | F | | M | F | M | F |
| Staphylococcus sp. + strept.pyognes | 1 | 1 | – | – | 1 | 1 | – | 1 | 5 | – | – | – | – |
| S.pyogenes + E.coli | 1 | 1 | – | – | – | – | – | – | 3 | – | – | – | – |
| S.epidermedis+ pseudomonas sp. | – | – | 1 | – | – | – | – | – | 1 | – | – | – | – |
| S.aureus + E.coli | 2 | – | – | – | 1 | 1 | – | – | 4 | – | – | – | – |
| Diphtheroids + S.pyogenes | 1 | – | 1 | – | – | – | – | – | 2 | – | – | – | – |
| Klebsiella sp. + Proteus sp. | – | – | – | 1 | – | – | – | 1 | 2 | – | – | – | – |

1=Age group) 1-15) years. L+: Leishmania positive skin lesion.
2=Age group) 16-50)years. L-: leishmania negative skin lesion

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