SHORT REPORT: OUTBREAK OF CUTANEOUS LEISHMANIASIS IN A NONIMMUNE POPULATION OF SOLDIERS IN WADI ARABA, JORDAN

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Abstract. An outbreak of zoonotic cutaneous leishmaniasis (ZCL) occurred in a battalion of 80 soldiers posted at Qurayqira camp in Wadi Araba in southern Jordan. The battalion spent an intermittent period of five and a half months in the area, during which 45.0% (36 of 80) of the soldiers showed clinical disease. Of the 44 clinically negative soldiers, 31 were tested with leishmanin and 11 (35.5%) were leishmanin positive. The number of lesions in infected soldiers ranged from one to 15 and were mostly on the face and extremities. This report shows the level of transmission of ZCL in Wadi Araba, which is presently undergoing economic expansion and development following the peace process of the Arab-Israeli conflict.

The stable endemicity of zoonotic cutaneous leishmaniasis (ZCL) due to *Leishmania major* in the Jordan Valley has been well documented.1-3 *Psammomys obesus* and *Phlebotomus papatasii* have been incriminated as the reservoir and vector, respectively, in that area.2, 4, 5 *Psammomys obesus* is replaced by *Meriones crassus* as the main reservoir of *L. major* in the Rift Valley and the Negev Desert along the Israeli side of Wadi Araba.6, 7 Wadi Araba represents the southern part of the Rift Valley and supports a semi-arid biotope similar to that of the Jordan Valley. Its population is sparse and nomadic, the majority of which are bedouins.

We report here on the occurrence of a multitude of leishmaniasis cases in a battalion of 80 soldiers who spent an intermittent period from April 17 to October 1, 1995 in a camp approximately 11 km west of the town of Qurayqira in Wadi Araba.

International ethical and safety provisions as pertaining to the use of human subjects were carefully followed. Soldiers voluntarily donated samples for diagnosis and received leishmanin injections given by medical professionals at the Parasitology Diagnostic Laboratory at Prince Hashem Military Hospital.

Qurayqira is situated approximately 200 km south of Amman and 60 km beyond the southern border of the Dead Sea.
OCCUPATIONAL RISK FOR LEISHMANIASIS

FIGURE 2. Cutaneous leishmaniasis in a battalion of 80 soldiers stationed at Qurayqira Camp, Wadi Araba, Jordan. a, percentage of soldiers showing various categories of the disease. b, estimated monthly appearance of cases. Values in parentheses are the number of cases.

Of the 80 soldiers, 31 (38.8%) had active lesions and five (6.2%) had healing lesions (scar formation stage) giving an overall infection or attack rate of 45.0% (Figure 2a). Active lesions were parasitologically confirmed while soldiers with healing scars were given leishmanin and showed a positive reaction. The earliest active lesions were noted in May 1995, with the majority appearing in July–November (Figure 2b). The number of lesions in infected soldiers ranged from one to 15, with 20 (55.6%) and 13 (36.1%) of the 36 infected soldiers having 1–2 and 3–6 lesions, respectively. The location of the lesions was mainly on the face and extremities.

To accurately determine the attack rate during the period spent at Qurayqira, we tested 31 of the 44 clinically negative soldiers with leishmanin. The remaining 13 soldiers were not available for testing. Of those tested, 35.5% (11 of 31) were leishmanin positive. They may have been previously exposed to *Leishmania* parasites, were already immune, and therefore should be excluded from the population at risk, or they may have contracted the infection at an early stage during the present duty period and were completely healed by the time they were inspected. In both instances, the actual attack rate would be higher than the manifested 45.0%.

Following thorough questioning, none of the soldiers were warned about the disease prior to or during their stay at Qurayqira. However, they were provided with insect repellents and mosquito nets as is usual for army troops when in the field. We attempted to see whether there was any correlation between protection from infection and use of insect repellents and/or nets but this was not possible because none of the soldiers used them regularly and properly.

The outbreak of cutaneous leishmaniasis in Qurayqira, whose biotope is representative of Wadi Araba, indicates that this area is hyperendemic for the disease, with half the soldiers acquiring the infection after spending the equivalent of only 2.5 months in the camp. Despite the fact that this was a direct result of occupational hazard as far as the soldiers

(Figure 1). The population of the town is approximately 500 and consists mostly of shepherds and farmers. The camp where the outbreak of ZCL occurred is located in an enclosed enclave 11 km west of Qurayqira, and is protected by small hills. The biotope is arid with scattered *Acacia* trees and sandy mounds supporting *Atriplex* bushes. Numerous active burrows, characteristic of the colonial rodent *Psammomys obesus*, were found at the base of *Atriplex* bushes, the nearest colonies being at the edge of the camp fence and penetrating inside it. The soldiers, all males and ranging in age from 18 to 35 years, were sent from their base in Zarqa, a well-developed area northeast of the capital Amman, which is free of cutaneous leishmaniasis, to the Qurayqira camp in Wadi Araba on a mine sweeping task. The soldiers were mobile during the day but spent their evenings and nights at their camp. Each soldier spent a total of 80 days at the camp, working for a week and returning home the following week.
were concerned, it reflected the possibility of the occurrence of major outbreaks in nonexposed communities introduced to the area through expected future demographic changes. With the prospective industrial expansion and development of tourism planned for Wadi Araba following the peace process of the Arab-Israeli conflict, preventative measures should be taken to avoid the emergence of ZCL in this area in the future. Preventive measures include a better choice of camp locations and construction sites away from areas where active burrows of rodents exist. Moreover, periodic residual insecticide spraying on the doors, windows, and inside walls of human habitation sites should be carried out to kill adult sand flies.

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REFERENCES