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CONTROL OF ZOONOTIC CUTANEOUS LEISHMANIASIS BY MASS LEISHMANIZATION IN HYPERENDEMIC AREA OF ISFAHAN

A.NADIM, E.JAVADIAN, G.TAHVILDAR-BIDRUNI, H. AMINI AND Y.PEZECHKI M. D.

From the School of Public Health and Research Institute for Public Health, Tehran University of Medical Sciences, Tehran, Islamic Republic of Iran

ABSTRACT

Zoonotic cutaneous leishmaniasis is hyperendemic in the rural areas, north and east of the city of Isfahan in the central region of Iran. Attempts to control the disease by different methods have all failed. A field trial showed that the effectiveness of leishmanization was successful in a limited part of this area. In February 1982 and 1983, more than 80,000 persons were inoculated. Our evaluation demonstrated that this vaccination program reduced the number of cases to almost one-seventh the expected number. In general, although this type of immunization may not be recommendable in most endemic areas, it may be used in persons and populations moving into high risk areas.

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INTRODUCTION

Zoonotic cutaneous leishmaniasis is an important health problem in Iran. There are at least eight different foci scattered in various parts of the country in which the disease is prevalent in the rural areas. In the Isfahan focus, intensive transmission exists, so that many indigenous residents acquire the disease before the age of five. In addition, the area is a center of growing industry and thousands of people are attracted to this region as temporary construction workers or as permanent residents, all of whom are at risk of this infection. Almost 80% of all reported cases of the disease in this country come from this focus. Therefore, we have studied the epidemiology of the disease and the possible methods of its control in this area since 1963. The disease is primarily an infection of the great gerbil *Rhombomys opimus* and the main vector to man is *Ph. papatasi*.

Attempts to control the disease with insecticides and spraying rodenticide in rodent burrows in a limited radius around the villages, failed to control the disease in man. Thus we reached the conclusion that the only way to control the disease is by immunization.[3-4] There is no vaccine in the true sense available for cutaneous leishmaniasis, therefore we decided to inject live and non-attenuated promastigotes of *Leishmania major* in a covered part of the body to prevent the disease from appearing on the face, nose, ear, etc.

In a preliminary field trial, we tested the effectiveness of this method in a limited part of this area. The results have been good so far; about 50% take of this "vaccine," and almost 70 to 80 percent developed a fair mmunity. According to the results of this field trial, the Department General of Public Health in Isfahan encouraged us to apply this measure in populations at high risk of infection. The present paper gives some of the results of this leishmanization program in Isfahan.

MATERIALS AND METHODS

We started the mass inoculation program in 1982, bearing in mind that the average incubation period of this leishmanization is 3-4 months and also the peak transmission season in this area is in August and September. We decided to inoculate the population at risk and non-immune children of less than ten years of age, 4-5 months before transmission seasons. The "vaccine" was administered to more than 20,000 chil-

dren in February, 1982, and to more than 60,000 in February, 1983. For leishmanization, we used the methods described by the authors in 1983.[5]

RESULTS AND DISCUSSION

In 1983, there were about 4500 cases of cutaneous leishmaniasis reported in Isfahan. Only 28 cases were among those who had been vaccinated. This is by itself an indirect index of the efficacy of the program.

In March 1984, twelve villages were selected in rural areas for this program. We compared the disease incidence in the vaccinated and non-vaccinated children less than five years of age. A total of 2677 children with no history of the disease were selected. 961 children were vaccinated and 1716 of the non-vaccinated served as a control group. The results after evaluation demonstrated that 16 cases of disease were seen in the vaccinated group, mostly in non-take persons, while we had 250 cases in the non-vaccinated group (Table I).

Furthermore, progress of the sores in the vaccinated group was rapid and small wounds lasting only 1-3 months were seen, while in the non-vaccinated group the disease had its natural course, with larger sores lasting 4-8 months.

In conclusion, our evaluation demonstrated that this vaccination program reduces the number of cases to almost one-seventh the expected number and also reduces the severity of the lesion, if it appears at all. Data also indicate that there is a good correlation between skin-test responsiveness and protection in vaccinated individuals.[5,6]

A very low percentage of the vaccinated persons had developed large lesions, some lasting more than one year, apparently due to a slow or insufficient innate immune response of these people. We have had a few cases of allergic reaction at the time of inoculation, all of which improved after a few hours. Also in one case we had a medical problem; this case was a woman of 19 years who voluntarily applied for leishmanization. She had some chronic muscle disease for which she was under steroid therapy for several years and she did not mention this at the time of leishmanization. She developed a very large deep sore which lasted for more than a year. She was asked to stop taking cortisone pills and was treated with glucantime.

Table I. Comparison of the incidence of disease among children in the vaccinated and non-vaccinated groups.

No. of Villages	No. of Vaccinated	Takes	Non-Takes	Cases of disease		No. of Control	cases of disease	
				No.	%		No.	%
12	961	671	290	16	2	1716	250	14

In conclusion, although this type of prevention may not be recommendable in most areas, but in special populations in which the risk of natural infection is very high, it may be recommended. Persons suspected of having immunological deficiency or undergoing immunosuppressive treatment should not be immunized.[7]

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