Seroprevalence of Brucellosis in HIV-Infected Patients in Sanandaj, Iran

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Background: Infection with human immunodeficiency virus (HIV) leads to cellular immune deficiency and theoretically patients infected with HIV are susceptible to brucellosis.

Objectives: The current study aimed to determine brucellosis rate in the patients infected with HIV.

Patients and Methods: We included 89 HIV+ patients from Sanandaj Consultation Center for Behavioral Diseases. Patients signed informed written consent before filling out the questionnaire. After serum collection, standard Wright tube, Coombs-Wright and 2ME-Wright tests were performed. Moreover, blood samples obtained from 502 individuals, who were not infected with HIV, were served as the control.

Results: The mean age of participants in the experimental and control groups were 33.31 ± 7.47 and 34.38 ± 11.29 years, respectively. In the Wright tube test for the HIV+ group, 71 individuals (79.8%) did not have an antibody against Brucella spp., while 18 patients (20.2%) were positive for the antibody. According to the results of Wright tube test for the control group, 63 (12.5%) participants were positive for anti-Brucella antibody. The frequency of antibody against Brucella spp. in the HIV+ group was significantly higher than that of the control group (P = 0.042).

Conclusions: HIV positive individuals in areas endemic for brucellosis must be investigated for the disease.

Keywords: HIV; Seroprevalence; Brucellosis

Implication for health policy/practice/research/medical education: Survey of brucellosis is suggested for HIV-infected patients in endemic areas of brucellosis due to the compromised immune system.
results were confirmed by the Western Blot method. The number of CD$_4^+$ cells in the infected patients was obtained from their medical file. Since risky behaviors including abusing IV-drugs, was the main route of infection acquisition for most of the patients, co-infection of HBV (Diaplus, San Francisco, USA), HCV (Diaplus, San Francisco, USA), and HTLV-I (Dima, Goettingen, Germany) were evaluated by the ELISA test (16-18).

In the Wright test, standard agglutination tube test was used. In this method, for each patient, 12 tubes were used, and the patient's serum was exposed to the Brucella antigen (Pasteur Institute, Tehran, Iran). The serum was then incubated at 37 ºC for 48 hours and the results were recorded. Coombs-Wright test (Pasteur Institute, Tehran, Iran) was performed after the Wright test. To determine the pattern of anti-Brucella antibodies, 2ME Wright test (Pasteur Institute, Tehran, Iran) was used (17, 19). Furthermore, after obtaining the informed written consent, 5 mL blood samples were obtained from 502 normal individuals who were negative for HIV, HBV, HCV (Diaplus, San Francisco, USA) and HTLV-I (Dima, Goettingen, Germany) infections in ELISA evaluations. The serological tests of anti-Brucella antibodies were performed on serum samples of these individuals.

3.1. Statistical Analysis

SPSS software, version 12 was employed to analyze the data and the results were provided in a tabular format according to descriptive statistics. Qualitative and quantitative data were compared by t-test and Chi-square test, respectively. P values less than, or equal to 0.05 were considered statistically significant.

4. Results

The mean age of HIV$^+$ patients was 33.31 $\pm$ 7.47 years, while the mean age of the control group was 34.38 $\pm$ 11.29 years. The two groups were not significantly different in this respect ($P > 0.05$). The mean CD$_4^+$ cell count in patients infected with HIV was $803 \pm 656.7$ cell/$\mu$L (Min: 50 cell/$\mu$L, Max: 4546 cell/$\mu$L). The number of CD$_4^+$ cells in women was higher than that of men, but the difference was not statistically significant ($P = 0.6$) (Table 1). The mean number of CD$_4^+$ cells in HIV patients positive for anti-Brucella antibody was $711.67 \pm 331.71$ cell/$\mu$L, while the number for patients negative for anti-Brucella antibody was $827.30 \pm 716.88$ cell/$\mu$L. The HIV$^+$ patients positive and negative for anti-Brucella antibody were not significantly different in this respect ($P = 0.5$).

In the HIV$^+$ group, 71 (79.8%) patients were negative for anti-Brucella antibody. Among the 18 patients who were positive for anti-Brucella antibody, three patients had high titers of the antibody. In the Coombs-Wright test, all patients were negative (Table 2).

In the control group, 439 individuals (87.5%) were negative for the antibody, and from the 63 individuals (12.5%) who were positive for the antibody, only one had an antibody titer of 1/40 and the others had a titer of 1/20. The prevalence of anti-Brucella antibody in the HIV$^+$ group was higher than that of the control group ($P = 0.042$). In the HIV$^+$ group, all the 18 patients who were positive for anti-Brucella antibody were male. While in the control group, from those who were positive for the antibody, 57 individuals were male and six were female.

| Table 1. Demographic, Epidemiological and Clinical Characteristics of HIV$^+$ Patients With Positive Anti-Brucella Antibody |
|---|---|---|
| Gender | No. (%) | Individuals With Positive Anti-Brucella Antibody, No. (%) |
| Male | 79 (88.8) | 18 (100) |
| Female | 10 (11.2) | - |
| Mean CD$_4^+$ cell count, Mean $\pm$ SD | | |
| Male | 790.73 $\pm$ 683 | - |
| Female | 904.4 $\pm$ 406.65 | - |
| HBV$^a$ | | |
| Positive | 1 (1.13) | - |
| Negative | 88 (98.87) | 18 (100) |
| HCV$^a$ | | |
| Positive | 31 (34.8) | 4 (22.2) |
| Negative | 58 (65.2) | 14 (77.8) |
| HTLV-I$^a$ | | |
| Positive | - | - |
| Negative | 89 (100) | - |

$^a$ Abbreviations: HBV, hepatitis B virus; HCV, hepatitis C virus; HTLV, human T lymphotropic virus-I.
5. Discussion

The obtained results indicated that the prevalence of anti-Brucella antibody in the HIV group was higher than that of the control group ($P = 0.042$). This is in accordance with the results obtained by Abdollahi et al. They reported that the frequency of brucellosis in HIV patients, determined by serological methods, was significantly higher than that of the control group ($P < 0.001$) (20). However, in the current study, the frequency of anti-Brucella antibody in the HIV group was 20.2%, while this rate was reported 73.3% in the study carried out by Abdollahi et al. The rates obtained in the two studies were significantly different. In HIV infection, CD4+ T cells become infected with HIV, while the activities of the virus and the immune response kill the infected cells. This leads to a reduction in population of the cells in the body, and consequently deficiency of cellular immunity (20). In the current study, although the mean number of CD4+ cells in HIV patients, positive for anti-Brucella antibody, was lower than that of HIV patients, negative for the antibody, yet the difference was not statistically significant ($P = 0.5$). In the study carried out by Abdollahi et al., no statistically significant relationship was observed between the mean number of CD4+ cells and the presence of anti-Brucella antibody in HIV-infected patients ($P > 0.05$). Previous studies reported that the prevalence of brucellosis in male HIV patients was higher than that of female patients (20, 21). In the current study, anti-Brucella antibody was observed only in male HIV-infected patients. In developed countries where brucellosis is under control, the ratio of male to female Brucella spp. infection was reported 1:5 to 1:6 (21). In almost all reports from brucellosis endemic and non-endemic countries, the rate of infection in men is higher than that of women. The underlying causes have been considered to be occupational factors or contact with livestock (22, 23). Our previous study and other reports showed that brucellosis mostly occurs in people taking contaminated dairy products, or those who have direct exposure to infected livestock, which occurs in slaughterhouses and ranches (19, 24, 25). The prevalence of brucellosis is high in west of Iran. Therefore, high-risk individuals such as those who have weak immune systems or HIV patients must be screened for brucellosis.

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Authors’ Contribution

Study concept and design: Rezaee, Rahmani and Jalili; analysis and interpretation of data: Rezaee, Rashidi, Ghaedi, Pazoki and Menbari; drafting of the manuscript: Rezaee, Rahmani, Ghaedi and Jalili; critical revision of the manuscript for important intellectual content: Rezaee, Rahmani, Ghaedi, Jalili, Rashidi and Menbari; statistical analysis: Rezaee and Rahmani.

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The authors declare that there are no conflicts of interest.

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References

5. Ruiz-Mesa JD, Sanchez-Gonzalez J, Reguera JM, Martin L, Lopez-Palmero S, Colmenero JD. Rose Bengal test: diagnostic yield and use for the rapid diagnosis of human brucellosis in emer-