Antibodies to HTLV-I p24 in African and Portuguese Populations


Abstract

Using a radioimmunoassay to detect HTLV-I protein antibodies of molecular weight 24,000, we screened populations from Algeria (140 subjects), Tunisia (442), Mali (69), Senegal (415), Uganda (135), the Central African Republic (77), the Congo (360), and Madagascar (193). Only four subjects were positive (1 from Senegal, 1 from Uganda, 2 from the Congo). This is a much lower figure than that found by others in Africa by the enzyme-linked immunosorbent assay technique. In addition, 319 Portuguese blood donors (46 of whom have lived in Angola or Mozambique) were screened using the same radioimmunoassay. All were negative.

Introduction

HTLV-I was initially isolated in the United States of America from an adult patient with T-cell lymphoma (1). Infection with HTLV-I is endemic in the southwest of Japan (2, 3), the Caribbean Islands (4, 5), and parts of South America (4, 6), where HTLV-I is associated with aggressive adult T-cell cancers.

Gallo et al. (7) suggested that HTLV-I had been carried from Africa to Japan by Portuguese seamen in the 16th century. Indeed, HTLV-I infection has been detected in human beings in Nigeria (8) and Kenya (9) and in monkeys from Africa (9, 10). Recently, Saxinger et al. (11) and Biggar et al. (12) conducted extensive surveys using ELISA in Tunisia, Egypt, Ghana, Nigeria, Uganda, and South Africa. With the exception of one group of black South African blood donors, antibodies to HTLV-I were detected in every population; the prevalence rate ranged from 2 to 10%.

We report the results obtained from 8 African countries using RIA to detect HTLV-I p24 antibodies. In addition, we screened blood donors from Portugal to test the hypothesis that HTLV-I was not carried from Africa to Portugal by seamen.

Populations and Method

The population screened consisted of 1836 subjects from northern, tropical, and equatorial Africa. The types of populations, age ranges (most of them were young adults), and sex ratios are shown in Table 1. Most of the groups had had blood drawn for other purposes.

In addition, 319 Portuguese blood donors, predominantly men, were tested, including 46 subjects who had lived in Angola and Mozambique.

Results

Of the 1836 samples from African populations, four gave positive results: 1 from a Senegalese pregnant woman (titer: 1/640); 1 from a Ugandan patient (1/5,120); and 2 from Congolese subjects (1/160, 1/10,240).

All samples from Portuguese populations were negative.

Discussion

The prevalence rate of HTLV-I antibodies we report in populations from Africa is low compared to the figures published by Saxinger et al. (11) and Biggar et al. (12). In particular, these authors reported a prevalence rate of 2.3% in Tunisian patients with inflammatory breast carcinoma and 6.3% in Ugandan Burkitt lymphoma patients and healthy controls. These differences may be related to the technique used to detect antibodies to HTLV-I and/or to the type of population screened.

We used RIA to detect antibodies specific to p24, the major internal protein of HTLV-I, whereas Saxinger and Gallo (14) used an ELISA method using disrupted viral particles as antigen. During the course of infection with HTLV-I, p24 antibodies might appear less often and/or persist for a shorter length of time than antibodies to other viral proteins. As far as internal proteins are concerned, p24 seems to be more immunogenic than p19 and much more than p15 (15). Antibodies recognizing the viral envelope proteins were detected in the sera of patients with adult T-cell leukemia by using a membrane immunofluorescence test (16). It has been shown that some sera were positive by ELISA and negative by radioimmunoassay (14). These sera might contain antibodies to the envelope glycoproteins. Another explanation of the differences between RIA and ELISA results is that the ELISA test might detect antibodies to common antigenic determinants shared by some proteins of other types of HTLV. Those determinants might not exist on HTLV-I p24. For example, antibodies against the envelope glycoproteins as detected by membrane immunofluorescence were frequently found in subjects with the acquired immune deficiency syndrome (17), whereas the lymphadenopathy-associated virus LAV/HTLV-III was not detected.
been isolated from the same patients (18–20). It should be pointed out that a high rate of LAV/HTLV-III seropositivity in healthy individuals has been reported recently from Zaire (21). Until now, such common antigenic determinants between HTLV-I and HTLV-III have not been reported, whereas they have been found for some proteins of HTLV-I and HTLV-II (22).

Interestingly enough, when testing these African patients by RIA, the background was low and similar to that which we observed in European and Caribbean populations (5). This contrasts with the high background observed with the ELISA which may be related to Plasmodium falciparum infection and attributed to polyclonal hypergammaglobulinemia (11, 12).

Given the diversity of populations screened by ourselves and others, it is difficult to compare the results directly. Several populations screened by Saxinger et al. (11) in Africa were patients with cancers. The characteristics of those populations do not seem to account for the high prevalence rates observed, at least in studies including control populations, since the figures were similar in both case and control groups. One of the main characteristics of the populations we screened is that they consisted of young adults and, in several instances, exclusively women. No significant sex differences have been reported until now for HTLV-I antibodies. In terms of age, it should be noted that the highest prevalence rate observed by ELISA in populations from Ghana (12) was in the 11–29 age range.

The possibility of geographical variations should be taken into account. The ELISA screenings (11, 12) showed marked variations, including absence of antibodies, in one of the South African populations. A low rate of HTLV-I antibodies has been reported previously in Kenyan students (9).

On a world scale, the HTLV-I p24 RIA did not detect antibodies in about 1000 sera from French blood donors (5). However, in blood donors from Martinique, a prevalence rate of 1.5% has been found (5). It should be noted that most of the positive subjects were in the oldest age ranges. Negative results have been obtained by others in Germany (9).

Clearly, a better knowledge of the dynamics of antibodies is required. Cross-sectional and longitudinal studies should be carried out on different types of populations in different places using various techniques to assess their sensitivity and specificity and also the significance of serological profiles.


The results obtained in Portuguese populations do not seem to support the hypothesis that HTLV-I was spread from Africa by Portuguese seamen. However, the population tested was not large enough to draw definite conclusions.

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