Seroepidemiology of HTLV-III (LAV) in the Federal Republic of Germany


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Summary. In 1984 10,281 sera were collected in the FRG and examined for antibodies to HTLV-III (LAV) with an enzyme-linked immunosorbent assay and confirmative tests. Of the German AIDS patients 81% have antibodies. Individuals belonging to AIDS risk groups, homosexuals, haemophiliacs and i.v. drug abusers, have antibody frequencies between 25%-72%. The detection of HTLV-III antibodies in blood donors indicates that the virus is being transmitted by blood transfusions.

Key words: Acquired immunodeficiency syndrome (AIDS) - Lymphadenopathy-associated virus (LAV)/human T-lymphotropic virus type III (HTLV-III) - Seroepidemiology

Introduction

A retrovirus, called LAV [1] or HTLV-III [2], most probably causes the acquired immune deficiency syndrome (AIDS) in men. This virus has repeatedly been isolated from patients with AIDS and lymphadenopathy syndrome (LAS) [2]. Viral infection precedes the development of AIDS [3]. Moreover, HTLV-III (LAV) selectively infects and destroys T4 lymphocytes [4]. Recently chimpanzees have been infected with LAV or HTLV-III and subsequently have developed specific antibodies and mild forms of LAS [5, 6]. Seroepidemiological data show that AIDS patients and persons at risk of AIDS have a high prevalence of antibodies to HTLV-III [7]. In the USA 27%-55% of asymptomatic homosexuals [8, 9], 72% of haemophiliacs [8], and 60%-87% of heavy abusers of intravenous drugs [9, 10] are seropositive. Initial studies from the FRG have indicated that 20%-30% of healthy homosexuals, 53%-74% of homosexuals with LAS or symptoms of AIDS related complex (ARC) and 50%-83% of AIDS patients have antibodies to HTLV-III [11, 12, 13, 14, 15, 16, 17, 18]. Moreover, a correlation of HTLV-III antibody levels with the severity of lymphadenopathy was observed [14, 15]. HTLV-III antibodies were also found in up to 80% of haemophiliacs [18, 19]. Here we present a seroepidemiological survey on the prevalence of HTLV-III antibodies in the FRG on the basis of 10,281 sera examined in three laboratories by the end of 1984.

Materials and Methods

Sera

Sera from homosexuals who almost all were examined for lymphadenopathy or AIDS related complex were collected in Berlin, Hamburg, Frankfurt, Cologne and Munich. Sera from patients with haemophilia A and B were obtained from clinical centres in Bonn, Göttingen, Heidelberg, Cologne, Frankfurt, Homburg/Saar and Ulm. Sera from i.v. drug abusers were collected in therapeutic institutions in Berlin and Munich. The blood donors examined originate from Berlin, Bremen, Bonn, Göttingen, Tübingen and Ulm. The sera from registered female prostitutes were obtained from Munich, the multi-transfused sera from Ulm and Munich. Most sera were collected in the second half of 1984.

ELISA Screening Test for Antibodies to HTLV-III

All sera were tested for IgG antibodies to HTLV-III by an enzyme-linked immunosorbent assay (ELISA) [13, 14, 16]. HTLV-III was harvested by centrifugation from the supernatant of cultured H9/HTLV-III cells. Detergent-treated virus was adsorbed onto microtiter plates. The sera were tested at dilutions of 1/50 or 1/100. After washing, bound immunoglobulins were detected by addition of a peroxidase coupled anti-human IgG antibody and a subsequent peroxidase colour reaction. Positive or questionable reactions were confirmed by
immunoblotting with purified HTLV-III [13, 16], immunoperoxidase staining of HTLV-III infected cells [13], or immunoprecipitation of cell extracts prepared from 35S-cystein labelled H9/HTLV cells [20]. We examined 512, 1,051 and 8,718 sera in Munich/Neuherberg (Gesellschaft für Strahlen und Umweltforschung), Frankfurt (Paul-Ehrlich-Institut) and Göttingen (Deutsches Primatenzentrum), respectively.

Results

As a necessary prelude to this multicentre survey comparability of the assay systems was monitored by exchanging sera. Test samples were examined in a blind fashion in each laboratory. The results of these pilot experiments were virtually identical despite minor technical variations of the assays. We therefore were able to pool the data as summarized in Table 1. By the end of 1984, sera from a total of 10,281 persons were screened for HTLV-III-antibodies by ELISA and confirmatory assays. The sera were obtained either from patients with AIDS satisfying the CDC classification or from various known AIDS risk groups such as homosexuals, haemophiliacs and i.v. drug abusers. In addition, we have included sera from other groups potentially at risk for infection with HTLV-III such as prostitutes, polytransfused patients, laboratory workers and HBV vaccinated individuals. In an attempt to gain some information on the prevalence of antibodies to HTLV-III among the general population, sera of 7,240 randomly selected blood donors were tested.

Discussion

In 1984, AIDS patients from Germany and persons belonging to the classical AIDS risk groups such as homosexuals, haemophiliacs, and i.v. drug abusers, have antibodies to HTLV-III to 25–81%. In the total group of male homosexuals the overall antibody frequency is 39%. 25% of asymptomatic homosexuals and 72% of homosexuals with LAS or ARC have detectable HTLV-III antibodies. The number of i.v. drug abusers tested so far is relatively low and may not be representative for this group. The figures for both risk groups are lower than those reported from the USA [8–10]. The situation in the FRG, however, is similar to that in Britain [21] and France [22, 23].

In haemophiliacs the frequency of antibodies to HTLV-III is quite variable. While patients who were only treated with heat-inactivated factor VIII preparations do not have antibodies to HTLV-III [19, 29], patients treated in centres where relatively high doses of coagulation factors (mostly untreated) were used, have antibody frequencies up to 80% [28]. Again the overall frequency in this group seems to be lower than that reported from the USA [8] but comparable to that in Britain [21].

The number of people examined in groups potentially at risk for infection with HTLV-III may not be representative except for the blood donors. All prostitutes tested were registered prostitutes from Munich. It would be important to examine prostitutes from other cities as well as non-registered prostitutes. Also, larger numbers of laboratory and clinical personnel either working with HTLV-III or taking care of AIDS patients should be monitored in the future. Similarly, a larger number of HBV vaccinees should be tested soon to confirm that the HBV vaccines available at present bare no risk of transmission of HTLV-III. Another group that should be carefully examined in the future are heterosexual partners of people at risk of AIDS [24].

The frequency of seropositives in blood donors (Schneider et al., submitted) strongly argues for testing all blood donors for antibodies to HTLV-III. Numerous transfusion associated AIDS cases have been reported from other countries [25, 26]. In summary our data show that all risk groups for AIDS are infected with HTLV-III to considerable extents similar to those reported from other European countries but less than in the USA. It has to be expected, however, that within the risk groups the frequency of infection found in the USA in 1984 will be reached in the FRG in 1985. The virus is being transmitted from the risk groups to other sectors of the population by sexual contact as well as by blood-transfusion. Transmission of HTLV-III by blood transfusion should be controlled immediately by testing blood donors.

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References