
Anti-LAV/HTLV-III Antibodies in High and Low Risk Groups

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Introduction

Serum antibodies to LAV/HTLV-III (lymphadenopathy-associated virus/human T-lymphotropic virus type III) [1-3] have been found in the majority of patients with AIDS (acquired immunodeficiency syndrome) and in AIDS-related syndromes as well as in groups of individuals at increased risk for AIDS such as intravenous drug users, hemophiliacs, homosexual/bisexual men and in partners of patients with AIDS [4-7]. Anti-LAV/HTLV-III antibodies have also been detected in a minor but not negligible proportion of subjects at no known risk for AIDS. Of these latter individuals, antibody-positive donors represent a group of particular epidemiological importance, since they can transmit LAV/HTLV-III infection to blood recipients through blood transfusion.

Here we report an update of anti-LAV/HTLV-III antibody prevalence among Italian individuals at low and high risk of acquiring LAV/HTLV-III infection. Next to the prevalence of antibodies, we have studied, on stored samples, at what time LAV/HTLV-III infection had first occurred and how the percentage of seropositivity had increased over the years.

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Material and Methods

Subjects

High Risk Groups. A total of 1,107 intravenous drug users, 115 hemophiliacs and 94 homosexual/bisexual men were tested for anti-LAV/HTLV-III antibody. Among drug addicts, 602 individuals were either outpatients on methadone maintenance or inpatients on infectious diseases wards in hospitals for acute viral hepatitis (group A); sera were collected from 144 of these individuals from March 1985 to March 1986 and from 458 subjects during the years 1979–1984. The remaining 505 drug users (group B) had voluntarily entered a therapeutic community during the years 1979 to March 1986 and had no parenteral drug exposure or sexual contacts while they were staying in the community; sera were collected from March 1985 to March 1986. In addition, 115 asymptomatic hemophiliacs treated in the last 5 years with commercial concentrates from USA-derived plasma and 94 asymptomatic homosexual or bisexual men were also examined.

Low Risk Group. From June to November 1985, a total of 48,266 volunteer blood donors attending 39 different Blood Transfusion Centers of Lombardy were screened for anti-LAV/HTLV-III antibody. Individuals examined (75% males, 25% females, mean age 35 years, range 18–65 years) roughly represent one-fifth of the donors of Lombardy. Among them, 43,163 were regular donors while 5,103 were at their first donation (occasional donors).

Methods

All serologic tests were performed by enzyme immunoassay (EIA) using commercially available kits (Abbott Laboratories, USA; Pasteur, France; Organon-Teknika, The Netherlands; Ortho-Diagnostic Systems, USA; Serti Biomedica, Italy). Samples were considered positive when they were repeatedly reactive by EIA. All EIA-reactive samples collected from blood donors were retested by Western Blot (WB) [8], using our own reagents or performed strips (BioRad, USA).

Results

High Risk Groups

As shown in table I, among intravenous drug addicts, the overall anti-LAV/HTLV-III prevalence in sera collected from March 1985 to March 1986 was 49.3% in group A and 40.3% in group B. Testing of stored samples collected since 1978 from drug users of group A revealed that LAV/HTLV-III infection had first occurred starting from 1981 with a significant increase of infections in successive years (fig. 1). As concerns group B, anti-LAV/HTLV-III was again absent in drug addicts admitted in the therapeutic community before 1981, while the percentage of antibody seropositivity rose progressively up to 53% in individuals admitted in 1985 to March 1986 (fig. 1). Noteworthy is that all individuals who were anti-LAV/HTLV-III nega-

Fig. 1. Percent of anti-LAV/HTLV-III positive people in two different groups of blood donors (1–6 years).

The prevalence of anti-LAV/HTLV-III treated during the study period was 40.8% (table I). The presence and the percentage of seropositivity was 53.4% in group A and 40.3% in group B. Finally, the incidence of anti-LAV/HTLV-III infections was seen to be significantly higher in intravenous drug users than in the general population.
hemophiliacs and 94 homosexu-
ally. Among drug addicts, 1,600 inpatients on infectious disease wards were collected from 144 of the 177 subjects during the years 1978 to 1982. Twenty-nine patients entered a therapeutic community. Of 1,596 drug exposure or sexually transmitted infection in the last 5 years with commercial homosexual or heterosexual contact.

Volunteer blood donors between age 35 years, range 19 to 60 years. Among them, 43,163 blood donors were considered (42.3% blood donors).

These blood donors were considered (42.3% blood donors).

The prevalence of anti-LAV/HTLV-III antibodies in high-risk groups varied from 2% in 1979 to 83% in 1986 (fig. 1). The overall prevalence increased from 2% in 1979 to 83% in 1986 (fig. 1). The overall prevalence increased from 2% in 1979 to 83% in 1986 (fig. 1). The overall prevalence increased from 2% in 1979 to 83% in 1986 (fig. 1). The overall prevalence increased from 2% in 1979 to 83% in 1986 (fig. 1).

The prevalence of anti-LAV/HTLV-III antibody in hemophiliacs treated during the 1980–1985 time interval with commercial concentrates was 40.8% (table I). No significant difference was found between antibody presence and type of concentrates used (factor VIII or IX). Antibody sero-

Fig. 1. Percentage of anti-LAV/HTLV-III in two groups of intravenous drug users by year of sampling (group A) or by year of admission to a therapeutic community (group B).

tive when admitted to the community, remained negative during their stay (1–6 years).

Finally, 11 (11.7%) of 94 homosexual/bisexual men were found to be anti-LAV/HTLV-III positive (table I). No correlation between the presence of anti-LAV/HTLV-III and markers of hepatitis B and hepatitis delta infections was seen.
Table I. Prevalence of anti-LAV/HTLV-III antibody in individuals at increased risk of infection (sera collected from March 1985 to March 1986)

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Anti-LAV/HTLV-III positive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Intravenous drug users</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group A</td>
<td>144</td>
<td>71</td>
</tr>
<tr>
<td>Group B</td>
<td>505</td>
<td>204</td>
</tr>
<tr>
<td>Hemophiliacs</td>
<td>115</td>
<td>47</td>
</tr>
<tr>
<td>Homosexual/bisexual men</td>
<td>94</td>
<td>11</td>
</tr>
</tbody>
</table>

Table II. Anti-LAV/HTLV-III in Italian blood donors

<table>
<thead>
<tr>
<th>Blood donors</th>
<th>EIA positive</th>
<th>WB positive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>cases</td>
<td>sex</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Regular</td>
<td>43,163</td>
<td>13</td>
</tr>
<tr>
<td>Occasional</td>
<td>5,103</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>48,266</td>
<td>28</td>
</tr>
</tbody>
</table>

Low Risk Group: Blood Donors

As is reported in table II, 28 (0.058%) blood donors were found to be repeatedly reactive by EIA. Of these, 13 were confirmed positive, whereas 15 were found to be negative when tested by WB. Immunoprecipitation bands were observed at 18, 25, 41 and 65 kilodaltons in all donors except 2 who showed p25 and gp41 bands. Sample/cut-off absorbance ratios were found to be much lower (median value 1.8, range 1.03–10.2) among donors EIA positive but WB negative than in those found positive by both EIA and WB (median value 10.4, range 2.2–16.5). More in detail (fig. 2), 10 (66.6%) of 15 donor specimens not confirmed by WB exhibited sample/cut-off ratios less than 2, whereas 8 (61.5%) of 13 WB-positive specimens showed ratios higher than 10. Noteworthy is that two EIA weak positive samples (sample/cut-off ratios respectively of 2.2 and 2.4) were confirmed ‘true’-positive by WB.

Of the 13 donors positive by both EIA and WB (table II), 4 (all males, mean age 34 years, range 25–40 years) were regular donors, while 9 (7 males, 2 females, mean age 25.5 years, range 22–33 years) were occasional donors.

Therefore, there was a significant difference in the prevalence of anti-LAV/HTLV-III positive or not positive (p<0.01). At the same time, all rebel donors were individuals with a significant past history of drug consumption, and/or a definite history of promiscuous behavior. In 28 of 29 rebel donors refusal was always accompanied by the fact that they recently had not attended regular blood donors.

Discussion

The discordance between the results of several in vitro tests has been found in anti-LAV/HTLV-III antibodies. A number of recent papers have emphasized the importance of accurate detection and to provide a reliable and consistent massive seroconversion test.
Therefore, the final anti-LAV/HTLV-III prevalence was 0.027%, with a significant difference between regular and occasional donors (0.009 vs. 0.176%, p<0.01). At least 11 (85%) of 13 anti-LAV/HTLV-III ‘true’-positive donors were individuals at increased risk: 7 subjects (5 males and 2 females) had a past history of intravenous drug use; 3 were bisexuals; 1 was a sexual partner of an anti-LAV/HTLV-III-positive female intravenous drug user; 1 donor refused to give information, while the last 1 (regular donor) apparently had no known risk factors. When interviewed, antibody-positive regular donors did not believe they were high risk.

**Discussion**

The discovery of LAV/HTLV-III was instrumental in the development of several in vitro diagnostic techniques for the detection of specific antiviral antibodies. Availability of such methods which include EIA, indirect immunofluorescence assay, radioimmunoprecipitation and WB, has proved essential in order to study the epidemiologic pattern of LAV/HTLV-III infection and to prevent the spread of the virus, through blood transfusion, by massive serological screening of the blood donors.
Several studies performed in the USA and in Europe have shown that anti-LAV/HTLV-III antibody is very frequent in some groups of individuals (high risk groups) such as promiscuous homosexual/bisexual men, intravenous drug users, hemophiliacs treated with unheated concentrates, sexual partners of patients with AIDS and babies born to LAV/HTLV-III carrier mothers. On the other hand, in the USA anti-LAV/HTLV-III has also been detected in less than 1% of blood donors.

From our data as well as from those obtained from other studies in Italy [5, 7, 9], the following points emerge: (1) Parenteral drug users are indeed at very high risk for acquiring LAV/HTLV-III infection. Among them, infection was absent before 1981, while a progressive increasing spread during the successive years was observed. (2) Anti-LAV/HTLV-III prevalence in Italian homosexual/bisexual males was lower than that reported in the USA [4]. This may be due to the different level of sexual promiscuity, generally believed to be lower for Italian than for US homosexual/bisexual men. (3) A high percentage of hemophiliacs was infected by LAV/HTLV-III in recent years. This fact was quite expected since they were treated exclusively with concentrates made in the USA and therefore were exposed to the same high risk of infection of US hemophiliacs. (4) The risk of transfusion-associated AIDS in our country seems at present to be an alarming but relatively small problem. Self-exclusion from blood donation of individuals at high risk for LAV/HTLV-III infection combined with implementation of careful blood donor screening for AIDS risk factors and for LAV/HTLV-III antibody are the measures to be applied for ensuring the safety of blood supply. (5) The EIA test for the screening of blood donors should be the most sensitive available in order to avoid false-negative results. The possible loss of specificity, as a consequence of maintaining high sensitivity, needs the confirmation of all presumptive positive reactions by the use of a test with greater specificity, such as WB.

References


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