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HIV-1 group O virus infection in Abidjan, Côte d'Ivoire

Côte d'Ivoire is the West African country that is most severely affected by the AIDS epidemic. In Abidjan, the economic capital, 15% of pregnant women and 45% of tuberculosis patients are HIV-infected [1,2]. Surveillance of HIV-1 subtypes among tuberculosis patients reveals that more than 90% of HIV-1 infections are due to subtype A; among persons with HIV-2 infection, HIV-2 subtypes A and B predominate [3].

The highly divergent HIV-1 group O virus, first identified in Cameroon in 1990 [4,5] is of public health interest because infections with this strain of viruses are not uniformly detected by some commercial serological assays [6,7]. To date, no formal surveillance for HIV-1 group O infections has been carried out in Abidjan. To elaborate and validate HIV serological algorithms in this population severely affected by the AIDS epidemic, we need a better understanding of the prevalence of this infection.

A total of 4451 serum or plasma samples obtained from various populations in Abidjan were selected for testing. All the samples had been tested previously by at least one whole virus lysate enzyme-linked immunosorbent assay (ELISA; HIV-1 and HIV-2, Genetic Systems,

Seattle, Washington, USA; or Genelavia Mixt, Sanofi Diagnostics Pasteur, Marnes-la-Coquette, France). These assays have been shown to have high sensitivity for the detection of antibodies to HIV-1 group O viruses [6,8]. The serostatus for the samples that were ELISA-positive was defined either by Western blot testing (HIV-1 Western blot, Genelabs Diagnostic, Singapore; HIV-2 Western blot, Sanofi Diagnostics Pasteur) or Peptilav 1-2 (Sanofi Diagnostics Pasteur). Samples were collected between 1994 and 1997 from participants in epidemiological studies: 1396 female sex workers (1240 HIV-seropositive, 151 HIV-seronegative, five Western blot-indeterminate), 712 pregnant women (604 HIV-seropositive, eight HIV-seronegative, 100 indeterminate), 1011 HIV-positive hospitalized patients, 1011 tuberculosis patients (975 HIV-seropositive, 12 HIV-seronegative, 24 indeterminate), and 321 blood donors (31 HIV-seropositive, 290 HIV-seronegative). Of the 4451 samples, 3228 were serotyped as HIV-1, 24 as HIV-2, and 578 as HIV-1 and HIV-2 dually reactive; 31 other sera from blood donors were HIV-seropositive, but information was not available for HIV type; 129 sera were Western blot-indeterminate; and 461 sera were HIV-seronegative by standard testing.



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To detect antibody to HIV-1 group O, we tested all sera by a research ELISA (Innogenetic, Ghent, Belgium) that incorporated a combination of V3-loop peptides from the ANT70 and MVP-5180 HIV-1 group O isolates [9,10]. Sera reactive by this ELISA were further tested by a group O-specific line immunoassay (LIA-O, Innogenetic), in which biotinylated V3 peptides from different group O and group M HIV-1 viruses were applied as a streptavidin complex in parallel lines on nylon strips. All samples that were either reactive (reactivity to group O V3-loop peptide) or indeterminate (reactivity both to group M and O V3-loop peptides) in LIA were further analysed using an HIV-1 reverse transcriptase (RT) PCR assay, by using primers sensitive and specific for group O viruses [10,11].

Of the 4451 samples, 37 (0.8%) were reactive by the group O-specific ELISA. When tested by LIA-O, 19 were indeterminate and 18 were negative. The 19 indeterminate samples were further tested by RT-PCR, but only one was positive. Thus, the overall prevalence of confirmed group O infection was one (0.02%) for all 4451 sera, or one (0.03%) out of all the 3861 HIV-seropositive sera. The confirmed HIV-1 group O sample was obtained in 1996 from a 22-year-old HIV-1-seropositive Ivorian woman hospitalized for meningitis. It is possible that some of the LIA-O-indeterminate samples were falsely negative by RT-PCR because of poor specimen storage conditions. However, it is more likely that these samples represent HIV group M infections. Peeters *et al.* [10] found that most samples that cross-reacted simultaneously with group O and M peptides in LIA-O were infected only with HIV-1 group M viruses.

Our finding of a very low (0.03%) prevalence of group O viruses in persons infected with HIV is in accordance with studies that have reported low prevalence of group O viruses in West African countries, including Senegal (0.07%), Togo (0.14%), Niger (0.3%), Mali (0%), and Burkina Faso (0%) [9,10]. These findings suggest that the current HIV serological algorithm used in Abidjan is suitable. However, periodic surveillance

for divergent HIV strains is important because of the high prevalence of HIV and the great mobility of the local population.

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