Identification of recent HIV infections in single serum sample: Comparison between the avidity index method and the serologic testing algorithm for recent HIV seroconversion (STARHS)

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Background

The identification of recent HIV infections using an antibody test is of central importance in establishing HIV incidence rates, and characterizing newly infected individuals. Transmission surveillance on evaluating the number of HIV infections among specific populations is the primary purpose of many sentinel surveys. Techniques based on the quantification of the existing immune response (specifying antibody titers, avidity for the antigen, and relative avidity of specific IgG for the recent infection) and those that have been based on the detection of HIV antigenemia have been established, but the advantages and limitations of these techniques are still not well described. The validation of cutoffs and performance criteria is of particular interest.

A retrospective seroconversion surveillance study was conducted in 1990 at the Centers for Disease Control and Prevention (CDC) for the purpose of which cases were defined, mostly in non-seroconverters (ABC). Specimens from recent seroconverters, having low antibody avidity, were in groups of sera drawn > 6 months after the diagnosis of HIV infection. The mean time period between the last negative and the first positive test was > 3 months (mean deviation 1.7). The mean time elapsed from the seroconversion was estimated with a 2-week interval (mean deviation 1.8), which was used as the cut-off for the presence of recent infections. The Working specimen dilution of the occurrence of HIV infection was 1:10 (40% attack rate). The methods were compared to assess their ability to detect persons with recent or long-standing HIV infections, and in terms of ease of performance, standardization, accuracy, and in determining the seroconversion results.

Materials and Methods

Study groups.

A total of 180 serum specimens from 150 volunteer participants, including 108 native Colombian and 42 foreign-born, were selected. These specimens were drawn from the 1990 seroconversion surveillance of CDC (seroconversion surveillance of CDC) and used for the STARHS seroconversion surveillance of CDC (STARHS). Of the 150 volunteer participants, 13 sera were positive for contamination and were excluded from the study.

Group 1: Recent HIV Infections (n=136 sera). Sera with high antibody avidity were included in Group 1, since they were considered as recent infections by STARHS and the avidity index, respectively. Results according to groups based on clinical information are shown in Table 1 and Figure 2.

Avidity index method

The avidity index method involves testing of samples in triplicate after a predilution and >20% variability of the replicates requires additional testing.

Assay results vary according to HIV subtype, requiring the adoption of different cutoffs before interpreting results.

Working specimen dilution

The working specimen dilution of the occurrence of HIV infection was 1:10 (40% attack rate).

Table 1. Comparison of the results of the avidity index method and the serologic testing algorithm for recent HIV seroconversion (STARHS).

Table 2. Distribution of distribution of optical density (OD) (2005 results) for STARHS and avidity index methods.

Table 3. Performance characteristics of the avidity index method and the serologic testing algorithm for recent HIV seroconversion (STARHS).

Table 4. Avidity index method.

Results

Avidity index method

The avidity index method involves testing of samples in triplicate after a predilution, and >20% variability of the replicates requires additional testing.

In this study, we used a modified protocol for HIV-1 screening (HIV-1 screening (HIV-1 screening) and confirmatory test (HIV-1 screening (HIV-1 screening)) involving testing of samples in triplicate after a predilution, and >20% variability of the replicates requires additional testing. In this study, we used a modified protocol for HIV-1 screening (HIV-1 screening) and confirmatory test (HIV-1 screening) involving testing of samples in triplicate after a predilution, and >20% variability of the replicates requires additional testing. In this study, we used a modified protocol for HIV-1 screening (HIV-1 screening) and confirmatory test (HIV-1 screening) involving testing of samples in triplicate after a predilution, and >20% variability of the replicates requires additional testing. In this study, we used a modified protocol for HIV-1 screening (HIV-1 screening) and confirmatory test (HIV-1 screening) involving testing of samples in triplicate after a predilution, and >20% variability of the replicates requires additional testing. In this study, we used a modified protocol for HIV-1 screening (HIV-1 screening) and confirmatory test (HIV-1 screening) involving testing of samples in triplicate after a predilution, and >20% variability of the replicates requires additional testing.

Data analysis

In order to assess the agreement between the STARHS and avidity index tests, a kappa statistic was calculated on the 180 serum specimens from 150 volunteer participants, in each of the 50 groups of groups of groups of groups of groups of groups of groups of groups of groups of groups of groups of groups.