Abstract #52

Detection of Antibodies to HIV-1 and HIV-2 by Rapid Magnetic Immuno-Chromatography Testing (MICT): Effectiveness of Multi-Subtype (HIV-1) and Branched Peptide (HIV-2) Antigens to Differentiate HIV Infections

Abstract Category:	New HIV Diagnostic Technologies Including Those That Are Not FDA Approved
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OBJECTIVE

The purpose of this study was to evaluate rapid magnetic immuno-chromatography technology for use in detecting antibodies to HIV-1 and HIV-2 and to determine the effectiveness of recombinant multi-subtype (HIV-1) and branched peptide (HIV-2) antigens to detect and to differentiate HIV specific antibodies.

METHODS

Magnetic immuno-chromatography testing (MICT) may be formatted as a traditional lateral flow assay using magnetic particles as the detector in place of colloidal gold or other colored markers. Analytes of interest are detected using a small instrument capable of quantitatively measuring distortions in the magnetic field associated with the specific capture of conjugated magnetic particles. We developed an MICT for the detection of antibodies to HIV-1 and HIV-2 and evaluated the MICT performance with a set of 370 serum/plasma specimens from the US, Cameroon, and the Ivory Coast (200 non-reactive, 90 HIV-1, 28 HIV-2, and 7 HIV-1 seroconversion panels [n=52]). Panel members were also tested by enzyme immunoassay (EIA)/ Western blot (WB) [reference standard], a commercial rapid test (OraQuick), and an in-house rapid lateral flow colloidal gold assay comparable to the MICT.

RESULTS

MICT detection is based on relative magnetic units (RMU). Non-reactive specimens averaged 17.5 and 2.6 RMU for the HIV-1 and HIV-2 antigens, respectively. A cutoff value for each antigen was established by adding 4 standard deviations resulting in 55 RMU for HIV-1, 30 RMU for HIV-2. No false positive reactions were noted (specificity = 100%). The results of the HIV-1 specimens and HIV-1 seroconversion panel members were congruent with EIA/WB, OraQuick, and the in-house rapid test results (sensitivity = 100%). Average RMU for strongly reactive specimens was 1660. All 28 HIV-2 specimens were detected (average RMU= 550), however, two specimens were classified as HIV-1 by MICT due to cross-reactivity.

CONCLUSIONS

MICT is effective in identifying HIV antibodies in serum and plasma. The HIV-1 and HIV-2 antigens effectively captured HIV specific antibodies; however, additional optimization of the MICT assay and antigen deposition could improve the quantitative nature of the test. MICT could be effective at identifying early infection especially if configured as a third generation format.