CASE REPORT

A case study of human immunodeficiency virus with positive seroconversion to negative

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Abstract

This case study demonstrates a 36-year-old ex-intravenous drug user (IVDU) who had been initially tested positive for human immunodeficiency virus (HIV) twice using Enzyme Immunoassay (EIA) method (Particle agglutination, PA done), but a year later he was tested HIV-negative. The patient was asymptomatic for HIV and T helper cells (CD4) count remained stable throughout this period.

In light of this case, there may be a need to retest by molecular methods for high risk category patients who were initially diagnosed HIV-positive, but later showing an unexpected clinical course, such as a rising or stable CD4 titre over the years.

Introduction

Combination of antiretroviral therapy has led to a major reduction in Human immunodeficiency virus-related (HIV-related) mortality and morbidity. However, HIV still cannot be cured.[1]

This case illustrates a 36-year-old man who was initially tested HIV-positive twice according to the Joint United Nations Programme on HIV and AIDS (UNAIDS) and World Health Organization (WHO) HIV testing strategies II,[2] but a year later he was tested HIV-negative. This may have implications in future for blood test models for such patients.

Case report

A 36-year-old single man had been using illicit drugs since 2000 including ganja (cannabis) and heroin through inhalation and sharing needles. He was enrolled for methadone maintenance therapy (MMT) at a health clinic A in mid-2008. On entry to the MMT, he was tested positive for both HIV and Hepatitis C (Table 1). He was asymptomatic, with no signs of opportunistic infections.

On urine drug screening, he was tested positive for morphine in 2008 prior to MMT, but since then it remained negative. The client is currently on MMT. In early 2010 he was transferred out to clinic B for employment purposes elsewhere but returned in 2011 to clinic A. On entry to clinic B for continuation of MMT, patient was retested for HIV according to local protocol. The tests done at clinic B showed a negative result for HIV but Hepatitis C remains positive.

The laboratory test results are shown below in Table 1.

Discussion

Serology testing has been the cornerstone in detection of HIV infection.[5] The traditional confirmatory tests, Western blot (WB), line immunoassay (LIA) and indirect immunofluorescence assay are highly specific and have played a central role in diagnostic algorithms.[6] However, studies have shown that combinations using enzyme-linked immunosorbent assays (ELISA) and Simple/ Rapid (S/R) assays can provide results as reliable as the WB or LIA at a lower cost and are easier to perform and interpret with fewer indeterminate results.[7] Therefore, WHO and UNAIDS have recommended testing strategies, which include a combination of ELISAs and/or S/R assays for HIV antibody detection, especially in settings with limited resources. Confirmatory testing with methods such as WB/LIA is not done in initial diagnosis.[2]

In this patient, the initial diagnosis of HIV was made after two separate reactive serology tests in the year 2008, in accordance with WHO/UNAIDS HIV testing strategies II.[2] A third HIV serology testing after 2 years in October 2010 showed weakly reactive result.

Table 1. Laboratory results

Date (Month/year)	Laboratory results	Place
August 2008	Anti-HIV 1 and 2 (ELISA):[a] Reactive Serology PA test for HIV 1 and 2:[b] HIV 1 Detected HBs antigen (EIA): Non reactive Anti-HCV (EIA): Reactive HCV test for LIA: Positive Liver function test: ALT: 69 (NR: 30–65) Other parameters: Normal	Clinic A
September 2008	Repeated with new serology sample Anti-HIV 1 and 2 (ELISA):[a] Reactive PA test for HIV 1 and 2:[b] HIV 1 detected	Clinic A
September 2008	T helper cells (CD4): 609 cells/μL	Clinic A
May 2009	T helper cells (CD4): 816 cells/μL	Clinic A
September 2009	T helper cells (CD4): 1193 cells/μL	Clinic A
October 2010	Anti-HIV 1 and 2 (ELISA): Weak reactive	Clinic B
November 2010	PA test for HIV 1 and 2: Not detected HIV viral load result : Target not detected Line immunoassay (LIA) method HIV 1 and 2: Not detected	Clinic B
November 2011	Anti-HIV 1 and 2 (ELISA): Non reactive HBs antigen (EIA): Non reactive Anti-HCV (EIA): Reactive HCV test for LIA: Positive	Clinic A
December 2011	Anti-HIV 1 and 2 (ELISA): Non reactive PA test for HIV 1 and 2: Non reactive	Clinic A
January 2012	Line immunoassay (LIA) method HIV 1 and 2: Not detected	Clinic A

[a]ELISA Axsym HIV 1/2 G.O test Manufacturer: Abbott Laboratory, Germany. Sensitivity: 100%, Specificity: 99.94%[3]
[b]PA Serodia HIV 1/2 test manufacturer: Fujirebio, Japan. Sensitivity: 100%, Specificity: 99.97%[4]

In view of the conflicting lab results, a HIV viral load test was requested by the doctor in clinic B in November 2010, which showed the results as HIV-negative. An algorithm issued by the Ministry of Health Malaysia for screening and confirmation of HIV recommends this approach.[8] The initial T helper Cells (CD4) count at diagnosis was 609 cells/uL with an increasing trend over the next 1 year.

In June 2014, Centers for Disease Control and Prevention (CDC) updated their recommendations to state that initial testing for HIV should be conducted with an FDA-approved antigen/antibody combination immunoassay that detects HIV-1 and HIV-2 antibodies with HIV-1 p24 antigen.[9] In our local setting it was not done in accordance with guidelines at that particular time.

There were several implications with these results: Most likely, it was an initial false-positive result due to serological cross-reactivity, in which antibody produced by immature immune response, other infections or autoimmune disorders, bind to the antigen in the test reagent.[10,11] This patient was tested positive for Hepatitis C with an initial slightly elevated levels of liver enzyme which may be due to a transient hepatitis at the time of diagnosis. His liver functions subsequently normalised when he was tested HIV-negative. There were some weak evidences linking Hepatitis B but not Hepatitis C infection with false-positive HIV result.[12]

Another common reason for false-positive was administrative errors such as patient's blood mix up, but it was not likely because the second testing was done with a fresh serology sample.

Other less likely causes such as overinterpretation of weak reactivity, genetics and contamination[12] were unable to be verified.

The least possible scenario was a true cure whence the patient had seroconverted from a HIV-positive to -negative status. The case report of a German patient with acute myeloid leukaemia, who received a bone marrow transplant from a donor, was the only known example of a sterilising cure.[13] Without genetic testing performed for this patient, there cannot be any certainty about this issue.

A false-positive HIV result could have severe negative impacts on patient in terms of emotional, social and economical aspects. Patient might be subjected to unnecessary emotional stress and social stigma, leading to breakdown in relationship and loss of employment. It would also incur higher healthcare cost due to unnecessary investigations and treatment.[14] As the current incidence and impact of false-positives in Malaysia was unknown, it was hoped that this paperwould stimulate more research in this area.

This patient was initially upset with the false diagnosis and being subjected to multiple tests repeatedly. However, he eventually accepted the fact after an honest, empathetic and reassuring pre and post test counselling session while addressing the possible causes of false-positive results.

Conclusion and recommendation

This case study highlights the need to retest high-risk category patients who are diagnosed with HIV initially, but later showing an unexpected clinical course, such as a rising or stable CD4 titre over the years. The latest CDC recommendations on the diagnostic algorithm in June 2014 may help to avoid false-positive diagnosis which can be devastating to the patient. Appropriate counselling strategies to handle this type of scenarios will be useful.

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