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HIV-1 Monitoring: Virological Response to Treatment

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Maabara ya Kisasa

May 2011 - Newsletter #26

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An individual's response to antiretroviral therapy (ART) is assessed by monitoring 3 parameters:

- HIV-1 viral load: the virological response
- CD4+ count: the immunological response
- Patient: the clinical response

HIV-1 viral load

HIV viral load (VL) monitoring is essential in order to:

- Ensure that patients are responding adequately to treatment.
- Detect early treatment failure i.e. failure to suppress the virus to undetectable levels, prior to the development of immunological or clinical evidence of treatment failure.
- Prevent the loss of antiretrovirals to resistance through poor adherence.

A number of studies have demonstrated that clinical assessment with/ without CD4+ count monitoring in the absence of VL monitoring leads to the misclassification of treatment failure in up to 45% of patients [1, 2, 3, 4]. >50% of those who develop treatment failure in the absence of VL monitoring will have multiple treatment-limiting mutations [5, 6, 7].

The VL detects and quantifies HIV-1 RNA in plasma. The VL is reported as copies/ml and a log value. The log value expresses the VL value as a power of 10. This provides a more manageable number to work with and more clearly represents clinically significant changes in the VL. A log change of >0.5 log is considered to be clinically significant [8]. The assay currently in use at Lancet is able to accurately quantify a VL ≥20 copies/ml. If virus is present at levels lower than this, the VL will be reported as <20 copies/ml. If no virus is detected, the VL will be reported as undetectable. NOTE: an undetectable VL does not mean an individual is HIV negative.

An undetectable VL on a specimen from someone who is not on treatment may indicate that:

- The individual is HIV negative – repeat diagnostic testing should be done if the diagnosis of HIV has never been confirmed.
- There is minimal viral replication as seen in long-term non-progressors (LTNP) and elite controllers: LTNP are individuals who maintain a high CD4+ count and remain AIDS free for many years without the use of antiretrovirals; elite controllers are LTNP who have undetectable viral loads.
- The individual is infected with HIV-2 or a viral variant not detected with the assay in use – please contact the laboratory to discuss testing options if this is suspected.

HIV viral load testing:

A dedicated specimen is required for HIV viral load testing. Please submit a PINK top tube. If a pink top tube is not available, a purple top tube may be used, but must be a separate tube to that sent for CD4+ counts or other Heamatological tests.

VL testing is recommended:

- At baseline(prior to initiation of ART)
- At 6-8 weeks after initiation of ART

– An early VL is essential for detecting a poor drug response prior to the development of significant drug resistance. This allows issues of adherence to be addressed before first line drug regimens are lost.

– >1 log reduction from the baseline value represents an acceptable response to ART.

- Every 4-6 months while on ART

–Fully suppressive ART should result in a VL <20 copies/ml by 12-24 weeks. [9]

Primary treatment failure refers to a VL that does not decrease appropriately on treatment. Secondary treatment failure refers to an increase in the viral load following initial adequate viral suppression. Poor drug compliance is the most common cause of treatment failure and should be addressed as early as possible.

A viral blip refers to an increase in the VL to <1000 copies/ml in an individual whose VL was previously suppressed. This may be due to a recent illness, vaccination, sub-therapeutic drug concentration or drug resistance. Adherence counselling is recommended and the VL should be repeated after 3 months to ensure viral suppression. A sustained VL >500 copies/ml increases the likelihood of drug resistance [9].

Response to virological failure:

If the VL is < 1000 copies/ml:
Exclude recent illness or vaccination, provide adherence counselling and repeat VL after 3 months

If the VL is > 1000 copies/ml:
Exclude recent illness or vaccination, provide adherence counselling and repeat VL after 1 month

Consider HIV resistance testing (a VL is routinely performed on specimens sent for resistance testing to confirm VL >1000 copies/ml)

Consider therapeutic drug monitoring if concerned about sub-therapeutic levels due to poor absorption or increased metabolism

All the HIV Monitoring Tests mentioned are done at Lancet Kenya and these are SANAS Accredited.

References:

1. Badri M et al. Utility of CD4 cell counts for early prediction of virological failure during antiretroviral therapy in a resource-limited setting. BMC Infectious Diseases 2008, 8; 89:1-8
2. Kantor R et al. Misclassification of First-Line Antiretroviral Treatment Failure Based on Immunological Monitoring of HIV Infection in Resource-Limited Settings. Clinical Infectious Diseases 2009, 49:454–62
3. Lutgarde L et al. Monitoring for treatment failure in patients on first-line antiretroviral treatment in resource-constrained settings. Current Opinion in HIV and AIDS 2010, 5:1–5
4. Reynolds SJ et al. Failure of immunologic criteria to appropriately identify antiretroviral treatment failure in Uganda. AIDS 2009, 23; 6:697–700
5. Kumarasamy N et al. High Frequency of Clinically Significant Mutations after First-Line Generic Highly Active Antiretroviral Therapy Failure: Implications for Second-Line Options in Resource-Limited Settings. Clinical Infectious Diseases 2009, 49:306–9
6. Orrell C, Harling G, Lawn SD, Kaplan R, McNally M, Bekker LG et al. Conservation of First-line Antiretroviral Treatment Regimen Where Therapeutic Options are Limited. Antivir Ther 2007, 12;1:83-8
7. Smith DM, Schoolet RT. Running with Scissors: Using Antiretroviral Therapy without Monitoring Viral Load. Clinical Infectious Diseases 2008; 46:1598–1600
8. Caliendo AM. Infectious diseases In: Molecular pathology in clinical practice. Leonard DGB (Ed.) 2007, New York, Springer, p404.
9. http://www.hopkins-aids.edu/management/laboratory_testing/full_viral_load_assays.html, accessed 10 January 2011.

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