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Newsletter

HIV-1 Monitoring Virological Response to Treatment

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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] More than 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 in 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 viral load. A log change of > 0.5 log is considered to be clinically significant.[8] The assay currently used most often in Lancet Laboratories 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 "Not detected".

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 negative. Repeat diagnostic testing (e.g. a 4th generation HIV-1 and -2 antigen/antibody immunoassay) 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.

Viral load 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 < 50 copies/mL by 12 - 24 weeks.

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 < 1 000 copies/mL in an individual whose viral load 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.

Response to virological failure:
If the VL is < 1 000 copies/mL:
- Exclude recent illness or vaccination
- Provide adherence counselling
- Repeat VL after 3 months

If the VL is > 1000 copies/ml:
- Exclude recent illness or vaccination
- Provide adherence counselling
- Repeat VL after 1 month
- Consider HIV resistance testing (a VL of > 1 000 copies/mL is required for HIV resistance testing)

HIV viral load testing sample requirement

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 haematological tests.

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