Viral load monitoring & adherence

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Viral load monitoring – why do we do it?

- Mortality & morbidity
- Emergence of HIV drug resistance
- Transmission
- Transmission HIVDR
- Health care costs
Interpreting viral load results

Viral load < 50 copies/mL
- Viral replication effectively suppressed
- Does not mean that there is no virus in blood or in body

Viral load ≥ 50 copies/mL
- HIV is actively replicating
- Further evaluation is required to find out why
Understanding detectable viral load

Insufficient drug levels in blood to suppress viral replication

Sufficient drug levels in blood but unable to suppress replication of drug-resistant virus

Once drug-resistant virus has emerged, even perfect adherence may not suppress viral replication
Viral load as a tool to improve adherence
Does it work?

Meta-analysis of 5 studies exploring resuppression after adherence intervention in people with viraemia

<table>
<thead>
<tr>
<th>Study</th>
<th>Proportion resuppressed (95% CI)</th>
<th>Number of patients</th>
<th>Number resuppressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calmy et al</td>
<td>77.48 (69.96, 84.20)</td>
<td>130</td>
<td>101</td>
</tr>
<tr>
<td>Khan et al</td>
<td>76.84 (62.88, 88.30)</td>
<td>40</td>
<td>31</td>
</tr>
<tr>
<td>Orrell et al</td>
<td>53.41 (38.74, 67.79)</td>
<td>43</td>
<td>23</td>
</tr>
<tr>
<td>Parker et al</td>
<td>54.22 (46.33, 62.00)</td>
<td>153</td>
<td>83</td>
</tr>
<tr>
<td>Wilson et al</td>
<td>89.05 (77.83, 96.65)</td>
<td>40</td>
<td>36</td>
</tr>
<tr>
<td>Overall</td>
<td>70.46 (56.57, 84.36)</td>
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NOTE: Weights are from random effects analysis

70% of people resuppressed following adherence intervention

N.B. Different VL thresholds to define initial viraemia and for resuppression

Bonner JAIDS 2013
Viral load as a tool to improve adherence
Is resuppression durable?

Cohort study (workplace HIV programme)

300 adults that had developed viraemia (VL >1000 copies/mL) on first-line ART then resuppressed to VL <400 copies/mL

Continued suppression without virological failure occurred in 49% (median follow-up 2.4 yrs)
Viral load as a tool to improve adherence
Does it work with second-line ART?

• Prospective cohort study (Themba Lethu clinic)

• 388 adults with VL >400 copies/mL on second-line ART who received enhanced adherence counselling and repeat viral load

• 249 (64%) resuppressed VL <400 copies/mL
Viral load as a tool to improve adherence
Is usefulness limited if higher levels of pretreatment drug resistance?

Meta-analysis of NNRTI PDR in ART-naïve adults in South Africa 2000-2016

NNRTI PDR has no effect on probability of viral suppression with TDF/FTC/EFV

Chimukangara AIDS 2018
Derache CID 2018
Viral load as a tool to improve adherence
What about in routine care settings?

- Cluster randomized trial of enhanced adherence counselling in DoH facilities in 4 provinces (GP, LP, NW, KZN)
- Enrolled adults on first-line ART with VL >400 copies/mL

12 Intervention clinics
EAC implemented by routine staff

71/358 (20%) repeat VL done
11/71 (15%) suppressed (VL <400)

12 Control clinics
Routine care

68/505 (13%) repeat VL done
24/68 (35%) suppressed (VL <400)
Viral load testing
Viral load testing performance

File audit in KZN found fewer than 50% of VL tests done as expected at all time points.

In adults, high levels of viral suppression in tests done.
Priority interventions – five step plan

- Viral load champion
- Viral load anniversary
- Synchronized data sources
- Viral load priority clinic
- Cascade to all clinics
Viral load testing performance

Significant improvement in VL tests performed at three pilot sites after implementation of 5 step plan

Improvement sustained at 12 months post-intervention

Viral load suppression rates high
Despite improvement in VL testing performance, persistent gaps in action taken after high VL
Viral load testing – is it cost-effective?

- Systematic review of cost-effectiveness of viral load monitoring
- Three key factors that determine cost-effectiveness
  1. Low-cost approaches to VL monitoring (e.g. dried blood spots or less frequent VL monitoring)
  2. Action based on VL results
  3. VL-informed differentiated care

5.6 million VL tests done per year in NHLS (ZAR ~1.9 billion)
Summary

- Viral load is a useful tool to assess adherence and to prompt intervention.
- Early detection of high viral load and prompt intervention can lead to resuppression.
- Coverage of routine VL testing can be improved with a relatively simple set of priority interventions (five step plan) within QI framework.
- More work is needed to strengthen action based on VL results.
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