The utility of resistance testing in the clinical management of HIV-1 infection

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BACKGROUND: The aim of this study was to review the utility of genotypic resistance testing. The prevalence of antiretroviral drug resistance in the UK is approximately 8% among antiretroviral therapy (ART)-naïve patients and 50% among ART-experienced patients. Current guidelines recommend early testing in all newly diagnosed patients and prior to starting ART in selected persons at risk of re-infection. Suboptimal suppression of viral load (VL) by ART should prompt further resistance testing (BHIVA guideline, 2011).

METHODOLOGY: HIV-1 genotypes, VL measurements and ART prescriptions were retrospectively collated for all patients who received one or more resistance test from May 2009-2010 at Chelsea and Westminster Hospital. Resistance to ART was determined using the Stanford algorithm.

RESULTS: A total of 1086 resistance tests were conducted on 998 patients (Figure 1). There were 137 test failures. A low VL was predictive of test failure (50% of failed tests vs. 16% of successful tests had a VL < 200 copies/mL (Figure 2)). Seventy percent of all successful tests were conducted on ART naïve patients, of whom 47 (8%) had resistance to at least one class of ART as ‘low-level’ or greater at the first test (23 NRTI, 18 NNRTI and 12 PI). In contrast, 22/122 (18%) of ART-experienced patients, who had not had a previous test, had baseline resistance (15 NRTI, 10 NNRTI and 6 PI) (Figure 3). Excluding test failures, tests were repeated on 54 ART-naive patients and 143 ART-experienced patients. Up to 15 repeat tests were ordered per patient since 2001. Only 6/64 of the repeat tests conducted on naïve patients showed increased resistance (Figure 4). In comparison, 35/166 tests repeated on ART-experienced patients showed increased resistance, yet only 8/166 (5%) informed a change in ART within three months. There were 33/166 repeat tests that resulted in a change in ART despite no change in resistance. There was no significant difference in log-fold VL decrease between those switching ART because of newly detected resistance or those switching despite no change in resistance (1.22 ± 1.16 vs. 0.83 ± 1.31, respectively; student-t test; not significant) (Figure 5).

CONCLUSIONS: The majority of repeat resistance tests provide no new information, particularly amongst treatment-naive patients. Repeating resistance tests among treatment-experienced patients rarely informs ART-regime change and changing therapy on an empirical basis may be equally effective in suppressing VL.

Figure 1: ART-resistance tests conducted at Chelsea and Westminster Hospital May 2009-2010

Figure 2: Samples with low viral loads resulted in test failure

Figure 3: Resistance detected in ART-naïve and ART-experienced patients at the first test

Figure 4: The majority of tests reported no change in resistance

Figure 5: Resistance testing did not significantly impact clinical outcome

Should HIV clinicians investigate resistance or resist investigations?