HIV Viral Dynamics and Immune Activation Following Successful TB Treatment

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Abstract

Background: Infection with Tuberculosis (TB) has been associated with increased HIV viral load in HIV-infected persons. Following TB treatment, studies in the US have shown decreases in viral load, whereas short-term studies in Africa have not shown reductions in viral load. Viral load dynamics have important implications for HIV disease progression, ART treatment decisions and HIV transmission.

Methods: We measured change in HIV viral load (HIV-1 RNA copy number), CD4 count, and CD4 and CD8 cell activation in 61 HIV-infected smear positive TB patients with CD4>350 successfully treated for TB in Kampala, Uganda with 1-2 years of follow-up. Change in laboratory measures was calculated within individuals and significance testing was done using the non-parametric Sign-Rank test. Successful TB treatment was defined as TB culture clearance at 2-6 months.

Results: At baseline (day 0 of TB therapy), median log HIV viral load was 4.4 (range 2.6-5.9) and median CD4 cell count was 523 (range 353-1247). No significant change in HIV viral load was observed at 6 or 12 months post start of TB therapy (median change in log viral load was +0.06 and +0.09 at 6 and 12 months respectively, p>0.4 for both). Median change in CD4 cell count at 6 and 12 months was -30 and -77 cells (p=0.05 & p=0.01). Similarly, among 34 subjects followed for 24 months, no significant change was seen for log HIV viral load (median change = -0.09, p=0.32) and CD4 counts were observed to decrease by 122 cells (p=0.01). Among a subset of subjects with immune activation data, CD4 activation decreased from baseline in 12 of 17 subjects at 3 months of TB therapy (p=0.01), 10 of 18 at 6 months (p=0.14) and in 6 of 9 at 12 months (p=0.10). CD8 cell activation decreased in 11 of 18 subjects at 3 months (p=0.06), 14 of 17 at 6 months (p=0.001), and in 8 of 10 subjects at 12 months (p=0.11).

Conclusions: We found no evidence of significant decreases in HIV viral load following successful TB treatment in the short term (at the completion of 6 months of TB therapy). Likewise we did not see significant decreases in HIV viral load in the long term (1 and 2 years following the start of TB therapy). CD4 cells loss was gradual and consistent during and following successful TB treatment.

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