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# Effect of Treatment of Asymptomatic Bacterial Vaginosis on HIV-1 Shedding in the Genital Tract among Women on Antiretroviral Therapy: Pilot Study

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**Keywords**

genital tract; HIV; AIDS; HAART; bacterial vaginosis

Bacterial vaginosis (BV) is a common and recurrent condition, often characterized by an asymptomatic disturbance of the vaginal flora. Studies have shown that BV is relatively common among HIV-infected women[1], and is a risk factor for both HIV acquisition and HIV shedding in the genital tract [2,3]. Current recommendations do not advocate treatment of asymptomatic BV [4]. This pilot study investigated whether treatment of asymptomatic BV would have an additional impact on HIV-1 shedding in the genital tract of women already receiving highly active antiretroviral therapy (HAART).

The study included 30 women on HAART with plasma viral load <75 copies/mL during the 3 months prior to enrollment . Asymptomatic BV was defined by satisfying 3 out of 4 Amsel's criteria or having a Nugent score (NS) greater than seven, and absence of gynecologic symptoms. These women were randomly assigned (non-blinded) in a 1-to-1 ratio to a treatment or observation arm. The treatment arm received metronidazole 500 mg twice a day for 7 days at the initial visit while the observation arm received no treatment. Participants returned 1 month later for follow-up. At enrollment and follow-up visits, women were tested for HIV plasma viral load (PVL), genital tract (GT) HIV-RNA (Nuclisens, BioMerieux), STIs, and BV (Nugent Score/Gram stain GS, and Amsel's score).

Women in the treatment and observation groups had similar age (median 42.5 years), race (53% white, 20% black), and baseline PVL distributions (27% detectable). At enrollment, all women met Amsel's definition for BV, 24 women had NS greater than 7, and 4 women (13%,

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95% CI = 3.7–31%) had HIV genital tract shedding. None of the women had other STIs including asymptomatic herpes simplex virus shedding.

Although insignificant, at the follow-up visit more women in the treatment arm (9/15; 60%) than the observation arm (5/15; 33%) had a negative Amsel's score (p=0.27). Women in the treatment arm had a median change in NS of −6 (range -10 to 2, p<0.002 for no change; Wilcoxon rank-sum test) and women in the observation arm had a median change in NS of 1 (range -4 to 4, p>0.05). The Wilcoxon rank-sum test comparing the mean changes was significant (p<0.001). Treatment also increased the probability of having a NS < 7 at the second time point (87% vs 27%) (p<0.01). Although statistically insignificant, the large effect size observed (log odds ratio −2.17, s.e.=1.3, p=0.10) support the conclusion that treatment of BV may be associated with a decrease in the odds of genital tract shedding (logistic regression, adjusting for detectable PVL at follow up).. Of the 4 women (3 observation; 1 treatment) who had GT shedding at enrollment, 1 woman in the observation arm did not have GT shedding on follow-up. The logistic regression analysis showed that detectable PVL positively correlated with GT shedding (log odds ratio 3.58, s.e.=1.4, p<0.05).

The current study demonstrates that the prevalence of HIV genital tract shedding is low among women on HAART with a diagnosis of asymptomatic BV. Treatment with Metronidazole decreases the rate of asymptomatic BV among these women. Our finding is consistent with the few related studies that assessed the impact of STI treatment on HIV-1 viral load. Wang et al. found that neither the shedding of HIV-1 RNA nor the prevalence of DNA changed following treatment of bacterial vaginosis among HIV-infected women[5]. Wolday et al noticed a modest reduction in shedding of HIV-1 related to overall syndromic treatment of STIs, and reductions in cervical HIV viral load among those women with clinical improvement [6]. The high prevalence of asymptomatic BV infection and evidence that BV facilitates HIV shedding make BV an area where interventions could have significant implications for HIV prevention. However, based on the results of our intention-to-treat analysis of this pilot study, future studies will need to be powered with larger sample sizes (about 500 per arm) and screening an even larger number of women to detect asymptomatic BV (6–8 per each case in the present study) due to low levels of detected genital tract HIV shedding among women on HAART.

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