HIV Infection and Drug Resistance with Unsupervised Use of HIV Pre-Exposure Prophylaxis

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Abstract

Although the Centers for Disease Control and Prevention currently only recommend daily dosing of HIV pre-exposure prophylaxis (PrEP), an on-demand PrEP dosing strategy that includes doses before and after sexual activity has been shown to reduce risk for HIV acquisition in men who have sex with men. In this letter, we report a case of HIV infection and drug resistance in a patient using PrEP outside of regular clinical care, adopting a sporadic, suboptimal dosing strategy with pills he obtained from his sexual partners. This case illustrates the potential risks of PrEP use without provider monitoring to ensure safe and effective dosing and laboratory follow-up, as well as key challenges that must be addressed as nondaily PrEP use becomes more common outside of controlled research settings.

Keywords: pre-exposure prophylaxis, human immunodeficiency virus, drug resistance; on-demand PrEP

EDITOR: On-demand HIV pre-exposure prophylaxis (PrEP), with two doses of emtricitabine/tenofovir disoproxil fumarate (FTC/TDF) in the 24 hours before sex and single doses for the 2 days after sex, has been shown to reduce risk for HIV acquisition in men who have sex with men (MSM) in a clinical research setting.¹ On-demand dosing offers an alternative to daily dosing, which has been demonstrated to be highly effective in both clinical trials² and clinical practice.³ Although the Centers for Disease Control and Prevention currently only recommends daily PrEP dosing, some individuals may already be using nondaily dosing. Self-driven dosing strategies may differ from the on-demand strategy evaluated in research studies, particularly when PrEP is used without clinical supervision. Here, we report a case of HIV infection and drug resistance in a patient using PrEP outside of regular clinical care with a suboptimal dosing strategy. This case illustrates the potential risks of PrEP use without provider monitoring to ensure safe and effective dosing and laboratory follow-up.

The patient was a 23-year-old Hispanic MSM with a medical history notable for injection drug use (IDU) and exchange sex. He had been informed by his sexual partners that FTC/TDF does not need to be taken daily to prevent HIV infection, and instead had been taking single tablets of FTC/TDF before and after some of his sexual encounters between late 2015 and September 2016, with decisions about use driven by access to medication. The patient reported occasional use of FTC/TDF when sexual

activity was associated with IDU, but denied sharing needles. The patient used pills given to him by his primary sexual partner, who had an FTC/TDF prescription for PrEP but was not using the medication consistently. The patient had insurance during this time but had not seen a provider and did not have any laboratory follow-up. He presented to the emergency department in September 2016 with a pruritic rash, and was diagnosed with secondary syphilis, rectal gonorrhea, and HIV infection (viral load 47,980 copies/mL, CD4 count 548 cells/ μ L). His last HIV-negative test was 1 year earlier, and he did not recall any acute HIV seroconversion symptoms. He was started on darunavir and elvitegravir/cobicistat/emtricitabine/tenofovir alafenamide pending HIV genotype results, and his baseline genotype revealed an M184V mutation. His viral load decreased to 547 copies/mL after 6 weeks of therapy and remained detectable at 160 copies/mL 6 months after initiating therapy, attributed to frequently missed doses that were reported by the patient. A repeat genotype, including integrase resistance, was ordered, but his follow-up viral load was undetectable; consequently, no genotype results were obtained.

This case highlights a misunderstanding of on-demand dosing in a patient using PrEP without clinical guidance, which may have resulted in acquired HIV drug resistance. Acquired mutations have been well documented when FTC/TDF is used during acute HIV infection.⁴ Moreover, if an M184V mutation is transmitted, patients such as ours with

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ongoing FTC/TDF use would be at risk for additional viral mutations. In this case, the timing of HIV acquisition is unknown, so we cannot assess whether FTC/TDF was being used suboptimally at the time of the sexual exposure when infection occurred. Regardless, screening for prior FTC/TDF use in patients with newly diagnosed HIV infection is critical for guiding treatment decisions, especially if antiretroviral therapy is started before obtaining genotype results. As awareness of on-demand PrEP dosing increases in the community, providers and public health organizations will need to convey the nuances of this more complicated dosing strategy and assist patients in decision-making about dosing and laboratory monitoring.

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