

Original Paper

The Science of Undetectable Equals Un-Transmittable Plays out in Real Life a Clinical Case Report

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Abstract

66-year-old African American man presented to the Infectious Disease Clinic for evaluation and treatment of Hepatitis C. Risk for Hepatitis C was Intravenous Drug Use (IVDU) 20 years earlier. Patient was referred to the Infectious Disease (ID) Clinic by primary care provider. Medical work-up, done by primary care provider, included HIV testing and the patient tested HIV+. Further testing by Infectious Disease Provider showed a cd4 643 @38% and a HIV RNA or HIV Viral Load of 43 copies/ml. Interestingly, this patient was unaware of his HIV (+) status and he is also newly married less than 2 years.

Keywords

long term non-progressor, elite controller, un-detectable equals un-transmittable (u=u), Treatment as Prevention (TasP), Pre-Exposure Prophylaxis for HIV (PrEP)

1. Introduction

66-year-old African American man presented to the Infectious Disease (ID) Clinic for evaluation and treatment of Hepatitis C. Risk for Hepatitis C was Intravenous Drug Use (IVDU) 20 years prior. Patient also reported a history of being incarcerated x 6 years. The patient was previously treated for Syphilis and had a titer of 1:1. Patient was referred to the Infectious Disease Clinic by primary care provider. Patient was also noted to have a positive Quantiferon tuberculosis (TB) result. He stated he was never treated for tuberculosis (TB) or Latent TB. Primary care work-up included HIV testing and he tested HIV+. Unfortunately, he had never been informed or counseled about the HIV+ diagnosis. Upon arrival in the ID Clinic, he was subsequently informed of the HIV diagnosis and further testing by

Infectious Disease Provider showed a cd4 683 @ 36% and a HIV RNA of 58 copies/ml. Interestingly, patient was newly married less than 2 years.

1.1 Definitions

- 1) Long Term non-progressor and/or Elite Controller-HIV infected people who are symptom free with a CD4 count above 500 cells/mm without the aid of antiretroviral therapy for a minimum of eight years.
- 2) Undetectable=Un-transmittable (U=U)—The concept that HIV infected individuals who are virally suppressed cannot transmit the HIV virus.
- 3) Treatment as Prevention (TasP)—HIV that is controlled with antiretroviral therapy that reduces the amount of virus in the body which helps to prevent HIV transmission to others via sex, needle sharing or from mother to child-to-child via pregnancy, birth or breastfeeding.
- 4) CD4 Count-CD4 cells are a type of white blood cell. They are sometimes also called T-cells, T-lymphocytes, or helper cells. They work by activating an immune response. One of the fundamental issues with HIV is that the cells meant to initiate an immune defense are the very same cells targeted for infection by Human Immunodeficiency Virus (HIV). Your CD4 cell count is the number of blood cells in a cubic millimeter of blood. It is not a count of all the CD4 cells in your body. A higher number indicates a stronger immune system. A normal or a CD4 cell count of a person who does not have HIV can be anything between 500 and 1500.
- 5) HIV (Human Immunodeficiency Virus). There is no cure for HIV but with effective medical care it can be controlled. HIV attacks the body's immune system, specifically the CD4 cells (T cells), which help the immune system fight off infections. Untreated, HIV decreases the number of CD4 cells (T cells) in the body, making the person more likely to get other infections or infection-related cancers.
- 6) Pre-exposure Prophylaxis (PrEP)—Pre-exposure prophylaxis for HIV is an HIV prevention tool used for people who are HIV negative but who are at substantial risk for HIV acquisition. The mainstay of PrEP is taking a daily pill, Truvada, to prevent HIV infection. PrEP is more than 90% effective in preventing HIV transmission especially when used with condoms and other STD/STI prevention methods.
- 7) HIV Viral Load (VL) or HIV RNA PCR—A Viral load test quantifies the amount of HIV's genetic material in a blood sample. The results of a viral load test are described as the number of copies of HIV RNA in a milliliter of blood. The higher the number the more HIV there is in your blood, then the faster your CD4 cell count will drop which equates to increased risk of becoming ill because of HIV.
- 8) The Joint Nations Programme on HIV/AIDS (UNAIDS)—The main global advocate for coordinated and comprehensive for action against the HIV/AIDS pandemic.
- 9) UNAIDS Goal/Target of 90-90-90 (for all countries)—90% of people living with HIV will be diagnosed by 2020.
90% of people diagnosed with HIV will be on antiretroviral therapy by 2020.

90% of people on antiretroviral therapy will have viral suppression by 2020.

2. Method

2.1 Diagnostic Focus & Assessment

1) HIV testing repeated, including repeating cd4 & HIV RNA.

a) Repeat HIV test (+)

b) CD4 683 @ 36%

c) HIV RNA 58 copies

d) Patient did not have any clinical symptoms of HIV

e) He denied weight loss or major changes in weight/appetite, no diarrhea, no nausea, no vomiting, no sore throat, no skin lesions, no lymphadenopathy

2) Wife got HIV tested for HIV & other Sexually Transmitted Diseases (STDs)/Sexually Transmitted Infections (STIs) she was also tested for TB.

a) Wife had negative HIV test, Negative HIV Viral Load test, negative RPR, TB, chlamydia/gonorrhea/trichomoniasis tests

3) Patient states HIV risk is from IVDA done 20 years ago in 1998 which is when he also had syphilis.

4) Patient denies any other risk activities to include men who have sex with men (MSM) or heterosexual contact other than wife.

5) Local Health Department notified & inquiry done to assess if previous or other HIV testing had been done/recorded within the state database—There was no other HIV testing information found in the database for this patient regarding HIV testing. Only the Syphilis testing which showed reactive with 1:1 ratio and documentation of appropriate treatment.

2.1.1 Therapeutic Focus & Assessment

The patient was prescribed Biktarvy. Biktarvy is the newest single tablet, once-daily regimen that includes tenofovir alafenamide and emtricitabine (BIC/TAF/FTC). It is an Integrase Strand Inhibitor (INSTI) that was approved by the United States Food and Drug Administration in February 2018. Single tablet regimens are used when possible and especially for naïve patients for simplification purposes. This drug also has few drug-drug interactions, a higher barrier of resistance when compared to other antiviral medications and has few side effects. Also, the TAF agent, included in this drug, concentrates in the CD4 cell having 90% less exposure to bone and blood as compared to the Tenofovir Disoproxil Fumarate (TDF) agent and the TAF agent it works even with TDF resistance. This patient also received the first shot of the Twinrix vaccine series. Twinrix is a vaccine that provides active immunity against both the hepatitis A and hepatitis B viruses. It is recommended and administered for people who are HIV infected because providers want to take precautions against patients acquiring other infections. Unfortunately, the patient refused the Pneumonia and Influenza vaccines, for personal

reasons. The patient's wife is being treated at a local health department with Truvada for Pre-Exposure Prophylaxis (PrEP) for HIV. The plan is to also treat and cure the hepatitis c infection and then treat Latent tuberculosis infection for this patient.

3. Result

The couple is relieved that the wife is HIV negative. The wife is somewhat knowledgeable about HIV as she has a relative who is HIV (+) and therefore was not threatened or too overwhelmed by the diagnosis. The wife desires to be on PrEP and to also use condoms, especially for contraception (as she is in her late 40s) after being counselled by the Health Department representative. The patient is happy that he can tolerate Biktarvy without any adverse side effects. The patient is also happy about being on a single tablet regimen and that this diagnosis did not destroy his marriage.

4. Discussion

This case illustrates that the concept of U=U works. This patient had an un-detectable HIV Viral Load via, per our assessment, long term non-progressor status. He did not transmit HIV to his wife of less than 2 years, even though he was not on HIV therapy. Traditionally, patients who are considered Elite Controllers or Long Term Non-Progressors are not necessarily initiated on Antiretroviral Therapy (ARV). However, this thought process is changing in the age of TasP, single-tablet regimens and with the much-improved side-effect profile noted with nearly all the new ARVs currently on the market. This patient specifically was initiated on ARV mainly for cardiovascular health to decrease proinflammatory response and to further reduce the likelihood of HIV transmission to his wife. He has some compromised renal function which also makes a case for ARV therapy, especially one containing the new Tenofovir Alafenamide (TAF) product, which decreases the potential of adverse side-effects related to bone and renal function especially for this 66-year-old African American male. This case demonstrates the importance of and the increased need for thorough history taking and HIV testing for the general population, but, most notably for high-risk individuals. It also represents the success and the proven biology of the notion undetectable equals un-transmittable (U=U). This outcome for this couple could have been very different and usually is especially for African American women.

African Americans represent 12% of the United States population but 44% of the new HIV infections. The message of U=U needs to be spread within the community at large to help decrease stigma and discrimination about HIV testing and treatment. Moreover, the eastern region of Virginia has the highest HIV prevalence (30%) in the state. Unfortunately, even with knowledge of these dire statistics, African American women, in particular, underestimate their risk for HIV acquisition. As clinicians and researchers need to continue to advocate for minorities with HIV and those at risk for HIV. We need to

draw substantial attention to the co-contributors of poverty, violence, gender oppression, substance abuse, mental illness, incarceration and educational disparities to reach the UNAIDS goal of 90-90-90.

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