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CASE REPORT

A case of human immunodeficiency virus (HIV) infection without increase in HIV RNA level: A rare observation during the modern antiretroviral therapy era

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Abstract

It is known that some with human immunodeficiency virus (HIV)-positive patients can remain immunocompetent for long period, maintaining their CD4-positive T lymphocytes (CD4 cells) while suppressing HIV. However, this population became rarely seen recently since potent antiretroviral therapy (ART) became available worldwide, and the latest guidelines recommend initiating ART regardless of the status of immunity of the patients. Herein, we present a rather unusual case of HIV-1 infection, where the patient was hospitalized for 3 years and was accidentally found to have the infection, without increasing his HIV RNA level in serum although his CD4 cells were decreased.

KEYWORDS

human immunodeficiency virus (HIV) infection, long-term nonprogressor, viral load

1 | BACKGROUND

It is known that some patients with human immunodeficiency virus (HIV) can maintain his or her CD4-positive T lymphocytes (CD4 cells)/ μ L, while keeping the viral load low, without initiating antiretroviral therapy (ART).^{1,2} We see these less nowadays since virtually all infected patients are now offered ART since the current ART regimens are much safer and easier to swallow than the regimens in the past, and interrupting the treatment is associated with worse outcomes.³

Herein, we report a rather unusual case of a man whose HIV infection remained unnoticed for several years. His CD4 cell count was low when diagnosed, but his viral load was also unusually low despite the absence of ART.

2 | CASE REPORT

A 71-year-old Japanese man was referred to our clinic for a positive HIV test. Three years prior to the initial visit, he was admitted to a

psychiatry hospital because of dementia. Two months prior to the visit, he accidentally fell and fractured his right humerus, and he was transferred to another hospital for surgical repair. He was screened for HIV upon admission, and the result turned positive. After surgery, he was referred to our clinic.

His past medical history other than described above is hypertension and hypothyroidism. He reportedly worked at coasts after graduating from a junior high school until in his 30 s. He had been arrested 7 times for repeated thefts. He then became homeless and used to gather waste cans, or was engaged in other day labors. His cognitive function started to decline while he was incarcerated and he was transferred to the psychiatry hospital. A nurse accompanying him stated that his cognitive function remained the same for years. His sexual history is unknown, and he has no known history of the use of illicit drugs. He had no family members we could contact with. We contacted the psychiatry hospital and confirmed that he has never been tested for HIV since his admission and he had never received ART. No apparent risks of HIV infection such as sexual assaults or needle stick injury were documented during his hospitalization.

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Host factors	Viral factors	Environmental factors
HLA alleles	Replicative capacity	Routes of infection
Genetic polymorphisms	Transmissibility	Risk practices
Restriction factors	Tropism	Years of infection
Immune responses	Virulence	Other STDs or comorbidities
	Genitive variability	
	Mutation rate	
	Viral fitness	

TABLE 1 Illustrative but not exhaustive factors proposed to be implicated to contribute to long-term nonprogressors (LTNP)

Note: Adapted from López-Galíndez¹.

Abbreviations: HLA, human leukocyte antigen; STDs, sexually transmitted diseases.

On physical examination, he was alert and able to create some voice but he was not able to converse with healthcare workers. Vital signs were normal, and the rest of the physical examination, including neurological examination except for ones described above, was unremarkable.

Laboratory tests revealed positive HIV-1 and negative HIV-2 on the Western blot test. His CD4 cell count was 235/ μ l, with CD4 percentage of 35%. White blood cell count (WBC) was 5,290/ μ l, with lymphocytes of 12.1%. HIV RNA level by polymerase chain reaction (PCR) was 52 copies/ml. Electrolytes, liver function tests, and kidney function tests were unremarkable. HBc antibody was positive with negative HBs antigen. HCV antibody was negative, and RPR/TPHA was negative. We sent his blood specimens to the National Institute of Infectious Diseases AIDS Research Center of Japan for potential further investigation, but there were no specific findings of the virus, and the detailed testing of his blood, such as genetic testing, was not possible without his consent.

We started ART consisting of Truvada® (tenofovir fumarate and emtricitabine combination) and raltegravir. HIV RNA level became undetectable, and repeat CD4 cell count was 580 (32%) on the following month, but his cognitive function remained the same. Several months later, however, he passed away unexpectedly for an apparent and sudden episode of asphyxiation. No autopsy was performed.

3 | DISCUSSION

Most HIV-positive people progress their immune deficiency over years and develop acquired immunodeficiency syndrome (AIDS) if they did not receive ART. However, a small minority of these infected people maintain their CD4 cell count and remain asymptomatic.^{1,2,4} These long-term nonprogressors (LTNPs) became less common since ART became readily available worldwide, side effects of the latest ART regimens became far less problematic, and the latest guidelines recommend initiating ART regardless of baseline CD4 cell count upon diagnosis.⁵⁻⁷

We presented a rather unusual case of an HIV-positive man who is most likely to have been infected at least more than 3 years ago. His CD4 cell count was relatively low, but his viral load was unusually low too. We rarely see this kind of patient lately because we begin ART upon the diagnosis of HIV infection. Some may remain

undiagnosed and progress to AIDS later,⁸ but without a diagnosis of the infection, the duration of the infection cannot be determined unless a patient went through a rather unusual time course such as the case we experienced. We are not certain of the reason why his CD4 cell count was low despite the low viral load. It is possible that he was able to maintain CD4-positive T-lymphocyte function thanks to a high CD4 cell percentage of 35%.⁹ However, his repeat CD4 cell count increased to 580 after initiating ART, suggesting he indeed had impaired cellular immunity.

Many factors are considered to be associated with LTNPs, such as HLA haplotypes, viral coreceptors such as CCR5 or CXCR4, the function of either cellular or humoral immunity, environmental factors, or others. [1, Table 1] No single factor explains all of LTNPs. We were not able to further investigate either him or his HIV, because of several reasons including his inability to consent to an investigation, especially of genetics, absence of surrogates, very low viral load, and sudden and unexpected death.

This patient had a chance of an early diagnosis of HIV infection earlier: upon incarceration, upon the diagnosis of dementia, and so on. Early diagnosis could have led to early initiation of ART, and it could have potentially improved his outcomes, such as his cognitive impairment if he had underlying conditions such as HIV-associated neurocognitive disorders (HAND). HIV testing is not offered routinely at prisons in Japan (personal communication with prison officers), but early detection with prompt treatment could even eliminate the new infection.¹⁰ One needs to be astute enough to suspect HIV infections early, and there need systems to encourage its early diagnosis in a variety of settings.

In conclusion, we saw an unusual case of HIV infection with presumably sustained cellular immunity. The case illustrates the importance of early diagnosis and prompt treatment of HIV infection, which is often unnoticed.

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CONFLICT OF INTEREST

The authors have stated explicitly that there are no conflicts of interest in connection with this article.

AUTHOR CONTRIBUTIONS

KI and NM both took care of the patient; SO did all laboratory work; and all equally prepared and completed the manuscript.

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