

## Viremic Controller -A Case Report

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### Abstract

A small subset of individuals with HIV 1 infection was identified with a rare ability to spontaneously maintain an undetectable viral load (VL) in the absence of previous or ongoing antiretroviral therapy (ART). One such case with increased risk behavior and the possibilities of viremic controller was discussed.

**Keywords:** *Elite controller; Viremic controller; Long term nonprogressor; Rapid progressor*

### 1. Introduction

HIV disease progression involves a complex interplay of genetic, immunologic, and virologic factors and varies with individuals. Primary HIV infection or acute infection goes unnoticed in many, in spite of the prevalence rate is 50%-90% of individuals [1,2]. Certain are Rapid progressors (clinical latency is less than 3 years) with short asymptomatic period [3]. Majority are chronic progressors as the HIV disease is a chronic systemic disease once it gets established inside the CD4 T lymphocytes. Presently the treatment strategy recommended by W.H.O, CDC and other international bodies recommend “Treat all” policy. That is starting the treatment immediately after the diagnosis of HIV infection immaterial of the CD4 count or viral load. An **Elite controller (EC)** is a HIV-1 positive subject who controls viral replication without antiretroviral therapy [4]. The subset of ECs is further distinguished from viremic controllers (VCs) and long-term non-progressors (LTNPs) primarily on the basis of their VL level [5]. A case report of Elite controller or viremic controller is described.

### 2. Case Report

A 43-year-old male was detected as reactive for HIV 1 infection, 21 years back, while he was trying for emigration to Gulf country in the year 2001 and it was confirmed with Voluntary Counseling and Testing Center (presently ICTC in India-

Integrated counseling and testing center) in 2002 and with YRG care center at Chennai in 2003. He is the leader for HIV positive people net work since 2003 onwards till date.

He was promiscuous and had premarital unprotected sexual exposures. He was a state level ‘KABADI’ player at that time. As his CD4 count was 1276 cells/cu.mm. during 2004 (when government ART roll-out program was started), he was not eligible for ART at that time and was deferred ART. He married to a HIV positive woman who was a widow and had two children for her first husband in the year 2006. She was also positive for HIV 1 since 2002 and she is on ART since 2003 (started at Tambaram Government ART centre, Chennai, where the program was started since 2003). He has a daughter by age of 14 years, born to them. All the three children were HIV nonreactive. He was practicing unprotected sex till date, sometimes ‘coitus interruptus’ as a measure to prevent further conception. Her CD4 count is maintained above 900 cells per cubic mm. and her viral load remains undetectable. But he has never been on ART for the past 21 years.

### 2.1 His recent follow up data were as follows

His Total WBC count was 11900 cells/ cu.mm, total RBC count was 4.65 millions/ cu.mm, Hemoglobin was 16.3 grams %, Platelet count was 2,66,000/ml. His differential WBC count was Polymorphs as 65%, Lymphocytes as 32%, Monocyte as 01%, Eosinophil as 02%, and the Basophil as 00%.

TABLE 1. His recent CD4 cell count pattern.

DATE	CD4 Count/ cu.mm
19-07-2018	898 cells
05-04-2019	1100 cells
29-09- 2019	1297 cells
12-10 2020	921 cells
02- 06-2021	1397 cells

His viral load on 03-08- 2021 was 3671 copies/ml.

### 3. Discussion

After the period of clinical latency, HIV positive individuals usually will manifest symptoms after 7- 10 years or longer as their CD4 T cell counts decline gradually in the course of the disease. In some instance, even after 13-15 years, certain individuals started manifestations. But we observe in all these cases slow and steady decline of CD4 cells in years as a rule and their viral load will have an ascending trend. Those who are manifesting the symptoms 8 years after the infection are called as ‘**long term non-progressors**’ [6].

But in this case, this individual remains immuno-competent with normal CD4 cell count even after 21 years without taking ART. Moreover, he married to HIV positive woman (who is on ART with an undetectable viral load), continues to practice

unprotected sex till date and having a child uninfected with HIV. In spite of all these risks, he was able to maintain his CD4 count and viral load without taking ART.

**Elite controllers** are HIV-1 positive subjects who control viral replication without antiretroviral therapy [4]. The subset of Elite Controllers are further distinguished as **viremic controllers** (VCs) and long-term non-progressors (LTNPs) primarily on the basis of their VL level [5].

The Elite controllers- (ECs) maintain viral loads below the limit of detection of commercial viral load assays whereas the Viremic controllers (VCs) have viral loads that are detectable but less than 2000 copies/ml [4]. **“Exceptional elite controllers”** (EECs), are a heterogeneous group of patients who may have achieved a higher degree of viral control, and possibly sterilizing immunity in some cases [4].

As this individual was maintaining the CD4 cell count above thousand without ART and his viral load remained less than 4000 (3671) copies/ ml with a total WBC was in the maximum normal limit, normal differential count and with all the other parameters also within normal limits, we can categorize him as an Viremic Controller. Moreover, he married to a HIV positive woman who is on ART (undetectable viral load), practicing unprotected sex, gave birth to a HIV free girl child. As the individual is having detectable viral load in his blood, we cannot label him with a sterilizing cure. It is a functional cure only. This individual can be called as Viremic controller rather than Elite Controller as he is having detectable viral load.

Mechanisms of Elite control are supposed to be due to either of these causes.

- Defective HIV-1 variants, innate resistance to HIV-1 infection with some individuals - protective HLA alleles, limited availability of susceptible CD4+ T cell targets , an immune-based control of viral replication - Increased activity of CD8 T cells or natural killer cells, absence of latent reservoir cells or viral sanctuary (early treatment started before the establishment of the viral reservoir) - (In this case the individual had no such early treatment),“Locked and Blocked” nature of virus inside these reservoir cells, replication incompetent virus etc.
- Virus cannot enter into the CD4 cells in the absence of the co-receptor CCR5. About 1% of the Caucasian population and 1.44% of the Western African population have the mutation, known as Delta 32, inherited from both parents which prevent the protein CCR5 from appearing on the cell surface [7,8]. But in this case virus detected in the circulation.
- Similarly, 58% of the partners or spouses of the HIV infected people remain HIV negative in spite of their regular unprotected intercourse for years and they had been called as **‘Discordant couple’** [9]. Roomy pelvis, roomy vagina, excessive lubrication, absence of STIs, absence of target cells, augmented T8 cell response, low viral load of the partner and the absence of co-receptor CCR5 can all be considered to play a role in these discordant couple.

#### 4. Conclusion

The exact mechanisms for the few remain as an Elite controller, Viremic controllers or sero-discordant couple is yet to be understood properly. If we are able to understand these factors responsible for the some remain as Elite controller and some remain as sero-discordant forever, then the total cure for HIV cure will not be very far away.

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