Venous Thromboembolism in Patients Infected with Human Immunodeficiency Virus

Archana Reddy, MD, Resident Physician, Department of Internal Medicine, Loma Linda University Medical Center; Gregory Aung, PharmD, Clinical Pharmacist, Infectious Disease Section, VA Loma Linda Healthcare System; Michael Ing, MD, Attending Physician, Infectious Disease Section, VA Loma Linda Healthcare System

Summary

A retrospective case series examined the epidemiological and clinical characteristics of 35 patients with HIV and history of DVT or PE at the VA Loma Linda Healthcare System from 2000-2015. The study aim was to identify characteristics and predictive factors common to HIV-positive patients who develop venous thromboembolism.

Introduction

During the current anti-retroviral era, the morbidity and mortality related to Human Immunodeficiency Virus (HIV) infection has shifted away from Acquired Immunodeficiency Syndrome (AIDS)-defining conditions and towards other clinical events. HIV-infected patients are at greater risk of developing venous thromboembolism (VTE) than the general population, with reports of up to a tenfold increased risk. The reported incidence of VTE in patients with HIV has ranged from 2.5-9.6 per 1000 person-years in clinical studies, compared to the risk of VTE in the general population which has been established to be 1.0 per 1000 person-years. Our clinical observations support these findings and suggest that degree of immunodeficiency and viral replication are predictive factors. Our aim is to identify characteristics common to HIV-positive patients who develop VTE.

Methods

All patients with HIV in the VA Loma Linda Healthcare System’s Clinical Case Registry (CCR) from 2000-2015 were screened to identify those with a history of deep venous thrombosis (DVT) or pulmonary embolism (PE); these patients were included in a retrospective case series. Each patient’s chart was reviewed to record epidemiological and clinical characteristics, which were described using frequencies for categorical variables, and mean and standard deviation (SD) for quantitative variables.

Results

35 patients with HIV and history of DVT or PE were included in the retrospective case series. The frequency of VTE among HIV-positive patients in this population was 35/1006 (3.5%) and the incidence of VTE was 5.8 per 1000 person-years.

- Figure 1: All 35 patients were male (21 White, 10 African-American, and 4 Hispanic).
- Figure 2: Mean (SD) age at time of diagnosis of VTE was 58 (12).
- Figure 3: Mean (SD) BMI was 25.65 (4.51).
- Figure 4: 2.9% of patients (n=1) had used injection drugs.
- Figure 5: 85.7% (n=30) of patients were on anti-retroviral therapy (ART) at the time of diagnosis.
- Figure 6: 48.6% (n=17) of patients had a history of opportunistic infection or malignancy.
- Figure 7: 57.1% (n=20) of patients had a history of recent hospitalization or surgery.
- Figure 8: Mean (SD) CD4 count at the time of diagnosis of VTE was 377 (244).
- Figure 9: 34.3% (n=12) had detectable viral load at the time of diagnosis, median viral load was 0, and mean (SD) viral load was 16,697 (44,937).

Conclusions

The incidence of VTE in our HIV-positive patient population of 5.8 per 1000 person-years is consistent with rates reported in the literature. Patients with HIV and who developed VTE often had relatively low CD4 counts and relatively high viral loads. This suggests an increased risk of VTE in HIV-infected patients and a potential association of VTE with degree of immunodeficiency and viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.

Contact

Archana Reddy, MD
PGY-3, Internal Medicine Residency
Loma Linda University Medical Center
Email: areddy@llu.edu

References

1. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
2. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
3. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
4. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
5. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
6. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
7. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
8. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
9. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
10. Baker JV. Chronic HIV disease and activation of the coagulation system.
15. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
16. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
17. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
18. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
19. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
20. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
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29. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
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34. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
35. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
36. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
37. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
38. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
39. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
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44. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
45. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
46. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
47. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
48. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
49. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.
50. Sullivan PS, Danzon AP, Jones JA. Viral replication, as seen in previous studies. Further investigation is necessary to determine correlation and/or causation.

Figure 1: Ethnicity
- White
- African-American
- Hispanic

Figure 2: Age at diagnosis

Figure 3: BMI
- White (BMI: 25.65, SD: 4.51)
- African-American (BMI: 25.65, SD: 4.51)
- Hispanic (BMI: 25.65, SD: 4.51)

Figure 4: History of Injection Drug Use
- Yes
- No

Figure 5: Anti-retroviral therapy (ART)
- On ART
- Not on ART

Figure 6: History of Opportunistic Infection or Malignancy
- Yes
- No

Figure 7: Recent Hospitalization or Surgery
- Yes
- No

Figure 8: CD4 count
- Yes
- No

Figure 9: Viral Load
- Yes
- No