Cardiac Manifestations in PLHA and Their Correlation with HIV Viral Load

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Abstract—**Background: The introduction of highly active antiretroviral therapy (HAART) has significantly improved the clinical evolution of HIV/AIDS, with an increased survival of infected patients. With advances in the management of patients living with HIV and AIDS, not only has survival increased but manifestations of late-stage PLHA are encountered more often, including cardiovascular complications.**

Objectives:

To determine the prevalence and characteristics of cardiac manifestations in patients with PLHA, and to correlate the cardiac manifestations with HIV viral loadMethods: 115 PLHA cases and 30 healthy control subjects were evaluated. HIV viral load was measured using quantitative PCR. Cardiac evaluation included detailed history, general physical examination, and echocardiographic assessment.

Results:

Echocardiographic abnormalities were found in 63% of the cases compared with 6% in the controls. Higher viral loads were associated with increased incidence of pericardial effusion, diastolic dysfunction, dilated cardiomyopathy, pulmonary artery hypertension, mitral valve prolapse, and reduced ejection fraction. Most abnormalities were concentrated in pastients with high HIV viral load (>100,000 copies/mL).

Conclusions:

Cardiovascular abnormalities in PLHA patients are common and can occur without any clinical manifestation. There was a significant association between high HIV viral load and cardiac abnormalities.

I. INTRODUCTION

HIV remains a significant public health burden globally. The virus affects multiple organ systems, including the cardiovascular system. HAART has changed the landscape of HIV-related illness, leading to increased life expectancy and the emergence of chronic complications such as cardiomyopathy and pericardial effusion. This study investigates cardiac manifestations in PLHA individuals and explores the association with HIV viral load.

II. METHODS

This observational study included 115 PLHA patients (≥18 years) and 30 healthy controls. PLHA was confirmed by ELISA and viral load was measured by RT-PCR. Patients were yet to start antiretroviral therapy. All participants underwent echocardiographic assessment using a Siemens Sonoline S1-450 with a 3.5-MHz probe. Cardiac dimensions and functions were analyzed per American Society of Echocardiography standards. Patients with pre-existing cardiovascular or pulmonary conditions were excluded.

TABLES

Table 1: Echocardiographic abnormalities in cases and controls.

Echocardiographic abnormalities	Cases (n=115)	Controls (n=30)	P-value
Pericardial effusion	17	0	0.025
Diastolic dysfunction	54	3	0.002
Dilated cardiomyopathy	18	0	0.020
Pulmonary Artery Hypertension	16	0	0.030
Mitral valve prolapses	17	0	0.025
↓ Ejection Fraction	25	0	0.004
↓ Fractional Shortening	40	4	0.022

Table 2: Echocardiographic dimensions in cases and controls.

Parameter	Cases (n=115)	Controls (n=30)	P-value
LA (cm)	3.116±0.2	3.22±0.3	0.085
AO (cm)	2.799±0.462	2.606±0.285	0.0031
IVST (cm)	0.95±0.3	0.78±0.2	0.0007
LVPWT (cm)	0.934±0.28	0.783±0.13	0.0024
LVMI (g/m2)	88.02±17.23	73.7±17.3	0.0001
RV dimension	3.061±0.41	2.98±0.25	0.113

Table 3: Association of echocardiographic findings with HIV viral load in cases.

Cardiac Manifestations	<10,000 copies/mL	10,000–100,000 copies/mL	>100,000 copies/mL	Total
Pericardial effusion	2	5	10	17
Diastolic dysfunction	10	20	24	54
Dilated cardiomyopathy	3	5	10	18
PAH	4	4	8	16
Mitral valve prolapses	1	4	12	17
Reduced ejection fraction	7	8	10	25
Reduced FS	7	12	21	40

III. RESULTS

Among the 115 PLHA cases, 63% showed echocardiographic abnormalities compared to 6% of controls. Cardiac abnormalities included dilated cardiomyopathy (15.65%), pericardial effusion (15%), pulmonary artery hypertension (14%), mitral valve prolapse (15%), reduced ejection fraction (22%), and diastolic dysfunction (47%). These abnormalities were more common in patients with higher HIV viral loads, particularly above 100,000 copies/mL.

IV. DISCUSSION

This study supports the notion that cardiac abnormalities are common among PLHA individuals and appear to correlate with viral replication activity. High HIV viral load is associated with increased inflammation and myocardial involvement, potentially explaining these cardiac changes. Compared to CD4 count, viral load might serve as a more direct marker of HIV activity and thus a better predictor of cardiac risk.

V. CONCLUSION

Cardiac abnormalities are common in PLHA patients and tend to be more frequent and severe in those with high viral loads. Echocardiography should be routinely performed in PLHA with elevated viral loads, even if asymptomatic. Further studies are needed to elucidate the pathophysiological mechanisms and evaluate the impact of antiretroviral therapy on cardiac health.

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