Clinical Resarch Artrcale

ECHOCARDIOGRAPHIC PROFILE OF ART NAÏVE HUMAN IMMUNODEFICIENCY VIRUS (HIV) INFECTED PATIENTS IN A TERTIARY CARE HOSPITAL IN KOLKATA"

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ABSTRACT

AIMS AND OBJECTIVE: Cardiac affection in HIV infection is a recognized entity. Some form of heart disease is demonstrable at autopsy in approximately 40 percent of cases and by echocardiography in approximately 25 percent of patients with AIDS. The studies indicate that cardiac involvements associated with HIV are mainly characterized by cardiomyopathy and pericardial disease. HIV infection is a global pandemic which is also rapidly spreading in India. We conducted the study to have some insight into the profile of Indian patients.

MATERIAL & METHODS: In this cross sectional hospital based study, we evaluated immunological (CD4 count) and echocardiographic status of 45 asymptomatic HIV seropositive patients who did not receive anti-retroviral therapy. The results were compared with age and sex matched controls. Statistical analysis was done using appropriate statistical methods.

RESULTS: Most common cardiovascular abnormalities were diastolic dysfunction (18%), followed by pericardial effusion (13%) and systolic dysfunction (7%). When compared with controls the study population had statistically higher number of diastolic dysfunction (p value = 0.035) but not systolic dysfunction (p value = 0.61); None of the control population was having pericardial effusion. Low CD4 count was significantly associated with pericardial effusion (p value 0.048) but the association with diastolic dysfunction (p value = 0.46) or systolic dysfunction (p value = 0.84) was not statistically significant.

CONCLUSION:
Cardiovascular complications are common among HIV infected patients in India, most common being diastolic dysfunction and pericardial effusion. Low CD4 counts are associated significantly with pericardial effusion. These abnormalities are likely to be found with greater frequency in clinical practice as management of opportunistic infections continues to improve.

KEY WORDS : HIV, CD4 count, diastolic dysfunction, pericardial effusion.

INTRODUCTION

HIV /AIDS is a global pandemic, with cases reported from virtually every country. At the end of 2007, 33.2 million individuals were living with HIV infection (range: 30.6–36.1 million) according to the Joint United Nations Programme on HIV/AIDS (UNAIDS). More than 95% of people living with HIV/AIDS reside in low- and middle-income countries; about 50% patients are female, and 2.5 million are children below 15 years1. Early in the epidemic, HIV infections were chiefly found in homosexual men; currently, however, most new cases occur in intravenous drug abusers and heterosexual partners of infected persons 2.

In Asia, an estimated 4.9 million people were living with HIV at the end of 2007. National HIV prevalence is highest in Southeast Asia, with wide variation in trends between different countries. The populations of many Asian nations are so large (especially India and China) that even low national HIV prevalence rates translate into large absolute numbers of people living with HIV1. Cardiac affection in HIV infection was recognized in early stages of HIV epidemic 3. Some form of heart disease is demonstrable at autopsy in approximately 40 percent of cases and by echocardiography in approximately 25 percent of patients with AIDS 4. Most of the studies that have reported the association of HIV with cardiac abnormalities have been carried out mainly in Europe, Africa and North America. These studies indicate that HIV infection is commonly associated with cardiac abnormalities, which are mainly characterized by cardiomyopathy and pericardial disease 5-7. There are very few literatures regarding Indian patients. We conducted the study to have some insight into the cardiovascular profile of Indian HIV patients.

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MATERIAL & METHODS

STUDY GROUP:

In this cross sectional hospital based study, we recruited 45 consecutive asymptomatic HIV seropositive consenting patients attending the apex referral clinic annexed to Medical College Kolkata, who did not receive anti-retroviral therapy. Those with documented history of cardiovascular disease, hypertension, diabetes mellitus, renal failure, hemochromatosis, tuberculosis and who were on cardiotoxic drugs were excluded from the study. 45 age and sex matched HIV negative relatives of study patients were taken up as control. After getting approval from the Institutional Review Board the study was conducted from January'09 to October'09.

STUDY PROCEDURE:

In this study, the patients underwent thorough clinical assessment and laboratory investigations for the categorization into their immunological status by CD4 counts and cardiovascular disease by echocardiography.

BLOOD SAMPLES:

Venous blood was collected from HIV infected individuals for lymphocyte typing; this was performed automatically using a flow cytometer.

ECHOCARDIOGRAPHIC EVALUATION:

Both study and control group population underwent two-dimensional, M-mode and Doppler echocardiography with Vivid 7 machine. Echocardiographic assessment of all cases was performed by the same person who was blinded to the HIV status of the patient. Left ventricular systolic function was determined by the left ventricular ejection fraction and diastolic function was determined by transmitral flow velocities and tissue Doppler study of mitral annulus.

STATISTICAL ANALYSIS:

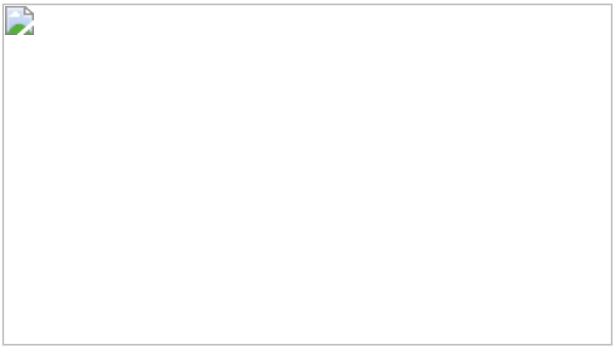
Analysis was done using appropriate statistical methods. Chi-square test and p value were evaluated by using SPSSv10.0 software (SPSS Inc. Chicago). P value of less than 0.05 was considered statistically significant.

RESULT

Mean age among HIV positive study and HIV negative control population were 33.24 and 34.96 years respectively (Diag.1). Sex ratios of the two groups were almost similar. Baseline age and sex distribution of the study population is shown in diag.2. Majority of the

Table 1 shows the distribution of different M-mode echocardiographic parameters within the study population. Among the 45 HIV positive individuals, cardiovascular affection was detected in 17 patients (38%). Most common cardiovascular abnormalities were diastolic dysfunction (18%), followed by pericardial effusion (13%) and systolic dysfunction (7%) (Diag.4). The left ventricular diastolic function was determined by the mitral E velocity / A velocity and tissue Doppler. Among the control population diastolic dysfunction was found in 2%. When compared with controls (Diag.5), the study population had statistically significant higher number of diastolic dysfunctions (p value = 0.035). 2% of control population had significant systolic dysfunction (EF<50%), though the difference with study population was not statistically significant (p value = 0.61), as depicted in Diag.6. None of the control population was detected with pericardial effusion (Diag.7) and this difference was again statistically significant (p value = 0.018).

No statistically significant correlation was observed between left ventricular diastolic dysfunction and immunological status of the cases (p value = 0.46), as shown in Diag.8. Diag.9 depicts the left ventricular ejection fraction in accordance to CD4 count of the cases. Here, no statistically significant association was found with left ventricular systolic dysfunction and immunological status (p value = 0.84). Significant statistical correlation (p value = 0.048) with immunological status was found among the 13% study population detected to have pericardial effusion (Diag.10). All the echocardiographic alterations are summarized in Table 2.



Diag.1 Distribution of sex and mean age among study and control group

cases were in 29 to 34 year age group. Number of males and females were almost equal in all the age groups. The mean CD4 lymphocyte count of the cases was 217/micro-litre (range 30–567). Most of the cases were in CD4 201 to 500 group (45%), followed by CD4 51 to 200 group (31%) (Diag.3).

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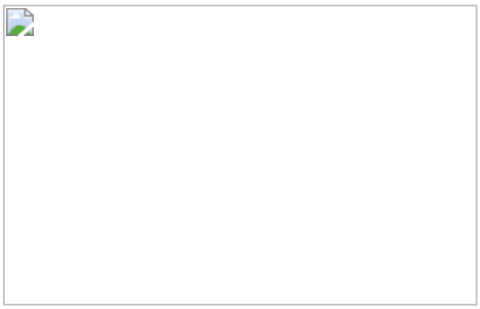
Diag.3 Distribution of CD4 levels (per µL) in the HIV + ve study population

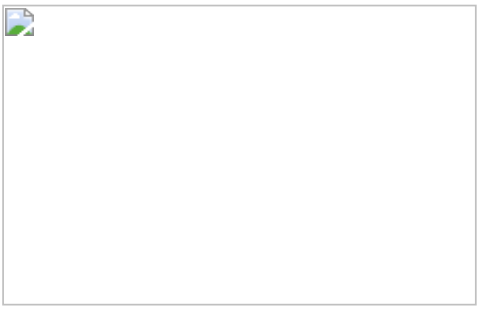
Diag.7 Comparison of pericardial effusion in study and control group

Diag.4 Cardiovascular abnormalities in HIV +ve study group

Diag.8 Diastolic function by CD4 count in the HIV + ve study group



Diag.5 Comparison of diastolic dysfunction in study and control group



Diag.9 Systolic function by CD4 count in the HIV + ve study group

Diag.6 Comparison of systolic dysfunction in study and control group

Diag.10 Pericardial effusion by CD4 count

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Table1: Comparison of M mode ehocardiographic parameters among study population

Table2: Summary of echocardiographic alterations in the study

DISCUSSION

Although the clinical presentation of HIV infection is still dominated by opportunistic infections, it is increasingly common for HIV/AIDS patients to be seen by cardiologists 8 and cardiovascular disease in HIV/AIDS is becoming increasingly recognized in the developing world 9. Despite this, heart disease can be overlooked in HIV-positive patients, because symptoms of breathlessness, fatigue, and poor exercise tolerance are frequently ascribed to other conditions associated with HIV infection 10. Cardiac complications of HIV infection tend to occur late in the disease or are associated with related therapies and are therefore becoming more prevalent as therapy and longevity improve 11,12. Complicated drug therapies for effusion, lymphocytic interstitial myocarditis, dilated cardiomyopathy (frequently with myocarditis), infective endocarditis, and malignancy (myocardial Kaposi sarcoma and B-cell immunoblasticmuscle disease, pericardial effusion and pulmonary hypertension, continue to predominate in resource-poor countries where less than 5 percent of patients are able to access antiretroviral drugs 4. A range of cardiac abnormalities associated with HIV infection has been suggested by autopsy studies; the conditions, in order of frequency, are pericardial effusion, lymphocytic interstitial myocarditis, dilated cardiomyopathy (frequently with myocarditis), infective endocarditis, and malignancy (myocardial Kaposi sarcoma and B-cell immunoblastic ymphoma) 14.

Pericardial effusion and pericarditis were the most common cardiac abnormalities found in early HIV/AIDS autopsy studies. Pericardial effusion was found in up to 38 percent of patients particularly in association with generalized fluid retention and advanced disease15. HIV-infected patients with pericardial effusions generally have a lower CD4 count than those without effusions, marking more advanced disease 16,17. We found pericardial effusion in 13% of Indian HIV patients and significantly related to low CD4 count. Pericardial effusion may be related to an opportunistic infection, metabolic abnormality, or malignancy, but usually the cause is not clear 2.

HIV-associated cardiomyopathy is characterized by global systolic functional impairment with or without left ventricular dilatation. Cross-sectional and retrospective studies suggest that cardiomyopathy is the leading cause of heart disease in Africa in acutely ill hospitalized patients with HIV 18,19. However some studies did not show significant systolic impairment 20.We did not find any significant systolic dysfunction in our study population. While some patients with left ventricular dysfunction present with features of cardiac failure, the majority has left ventricular dysfunction, detected only by echocardiography, without any clinical suggestion of heart failure 18.

Diastolic dysfunction as a cardiac manifestation of HIV infection has been reported in a few western studies 21,22. Among the very little data that has been reported from Asia 23, it has been found to be commonest abnormality in Indian patients. We found similar result with diastolic dysfunction being present in 18% patients which was statistically significant, though statistical correlation was absent with immunological status.

HIV infection have sustained life but may increase cardiovascular risk and accelerate atherosclerotic disease 11,13.

At the beginning of the epidemic, heart muscle disease was the dominant cardiac complication of HIV infection in the developed world, and tuberculous pericarditis was the most important cardiac manifestation of the disease in Africa. The advent of highly active antiretroviral therapy (HAART) has changed the pattern of disease in developed countries where premature coronary artery disease and other manifestations of atherosclerosis are now the most common cardiovascular disorder. This is partly caused by HAART-induced metabolic problems, particularly insulin resistance and hyperlipidemia, but also reflects a high prevalence of conventional cardiovascular risk factors such as smoking. Cardiovascular problems associated with advanced immunodeficiency, such as heart muscle disease, pericardial effusion and pulmonary hypertension, continue to predominate in resource-poor countries where less than 5 percent of patients are able to access antiretroviral drugs 4. A range of cardiac abnormalities associated with HIV infection has been suggested by autopsy studies; the conditions, in order of frequency, are pericardial

The mechanisms for the development of LV dysfunction, cardiomyopathy, and myocarditis in AIDS remain unclear. In addition to the role of HIV, lymphocytic myocarditis, and cytokines, the contributions of autoimmune responses, illicit and prescribed medications, nutritional deficiencies, and other factors also appear to be pathogenetically or pathophysiologically important 24.

CONCLUSION:

Cardiovascular complications are not uncommon in Indian HIV infected patients, most common being diastolic dysfunction and pericardial effusion. In earlier days of HIV pandemic presentation of these cases were chiefly dominated by opportunistic infections predominantly involving the respiratory, nervous and gastrointestinal systems As management of opportunistic infections continues to improve cardiac abnormalities are likely to be found with greater frequency in clinical practice. Low CD4 count has been associated with pericardial effusion, therefore its presence and severity should be looked for as the disease progresses.

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