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*Research Article*

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# Echo Cardiaography Abnormalities in HIV Infected Patients in Tertiary Care Hospital in Urban part of Tamil Nadu

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## ABSTRACT

***BACKGROUND****: The human immunodeficiency virus (HIV) is a lentivirus a subgroup of retrovirus that causes the acquired immunodeficiency syndrome (AIDS) a condition in humans in which progressive failure of the immune system allows life-threatening opportunistic infections and cancers to thrive. HIV infects vital cells in the human immune system such as helper T cells (specifically CD4+ T cells), macrophages, and dendritic cells. HIV infection leads to low levels of CD4+ T cells through a number of mechanisms, including apoptosis of uninfected bystander cells, direct viral killing of infected cells, and killing of infected CD4+ T cells by CD8 cytotoxic lymphocytes that recognize infected cells. When CD4+ T cell numbers decline below a critical level, cell-mediated immunity is lost, and the body becomes progressively more susceptible to opportunistic infections and multisystem involvement. From the beginning of the AIDS epidemic, it was recognized first at autopsy and later by non-invasive techniques that HIV infection can cause cardiac abnormalities.* ***Aim of The Study****: To assess echocardiographic abnormalities in HIV infected individuals and its relation with CD4 count.* ***Materials and Methods:*** *A total of 200 patients were randomly chosen from the Anti-Retro viral Therapy clinic. After excluding fifty patients, Remaining 150 patients were divided into two groups depending on the CD4 count. Group I included patients with CD4 count ≤ 350 cells / mm3. Group II included patients with CD4 count > 350 cells / mm3. All patients were subjected to a questionnaire to assess the risks of acquiring HIV, risk factors for cardiac disease and symptomatology of cardiac illness. A thorough clinical examination of the cardiovascular system, respiratory system, abdomen and central nervous system was done. CD4 count and echocardiography were done for all patients.* ***Results****: Prevalence of echocardiography abnormalities was 10.7% in our study. Pericardial effusion was the most common echocardiographic abnormality. Echocardiographic abnormalities were specifically correlated with CD4 counts. In this study 13 out of 51 patients with CD4 counts ≤ 350/mm3 had cardiac abnormalities. 3 out of 99 patients with CD4 counts of > 350/mm3 had cardiac abnormalities.* ***Conclusion****: Present study recommends screening for cardiac abnormalities in HIV patients to identify early cardiac involvement and minimize cardiac complications by early intervention*

***Key words****: HIV infection, Cardiac abnormality, Echocardiography.*

## INTRODUCTION

Acquired Immuno Deficiency Syndrome was first recognized in the United States in 1981 when the U.S Center for Disease Control and prevention (CDC) reported unexplained occurrence of Pneumocystis jiroveci pneumonia in five previously healthy homosexual men. In 1983, Human Immuno Deficiency Virus was isolated from a patient with lymphadenopathy and in 1984 it was demonstrated clearly to be the causative agent of AIDS[1]. India's first case of AIDS was reported in 1986 from Chennai[2].

The reasons for the paucity of knowledge about the etiology of HIV associated cardiovascular diseases are

1. In the early years of AIDS epidemic, most patients died of infectious complications, before the manifestations of cardiovascular complications.
2. Because cardiomyocytes do not have CD4 receptors, the heart was thought to be unaffected by HIV infection.
3. Presence of cardiovascular risk factors like poor nutrition, alcohol and drugs that can lead on to cardiac disease in HIV infected individuals.
4. Cardiac disease remains relatively asymptomatic in early stages of HIV infection.
5. Symptoms of breathlessness, fatigue and poor exercise intolerance are frequently ascribed to other conditions associated with HIV infection[3].

Cardiac involvement is demonstrable at autopsy in approximately 40% of cases and by echocardiography in 25% of patients with AIDS. Many of these lesions are mild, and HIV related heart disease probably causes symptoms in less than 10% and death in less than 2% of all patients with HIV infection. At the beginning of the epidemic, heart muscle disease was the dominant cardiac complication of HIV infection in developed world, and *tuberculosis pericarditis* in Africa[4]. The advent of HAART (highly active anti-retroviral therapy) 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 risk factors such as smoking. Cardiac 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% of patients are able to access anti-retroviral drugs[5].

## MATERIALS AND METHODS

The study was conducted in January 2008 to June 2008 in the Department of Medicine, Kilpauk Medical College and Hospital. Another Collaborating Department – ART Centre, Department of Cardiology, Kilpauk Medical College and Hospital. A total of 200 patients were randomly chosen at the start of the study. Fifty patients were excluded from study because of exclusion criteria. Among the 150 patients 62 males and 88 females in the study group. They were divided into two groups depending on the CD4 count. Group I included patients with CD4 count $\leq$ 350 cells / mm3. Group II included patients with CD4 count > 350 cells / mm3. Majority of the HIV individuals in South Indian populations with CD4 counts of 200 - 350 cells / mm3 have high viral road than North Indian and Western counter parts[6].

### INCLUSION CRITERIA

1. Patients who have been diagnosed as HIV positive by ELISA method

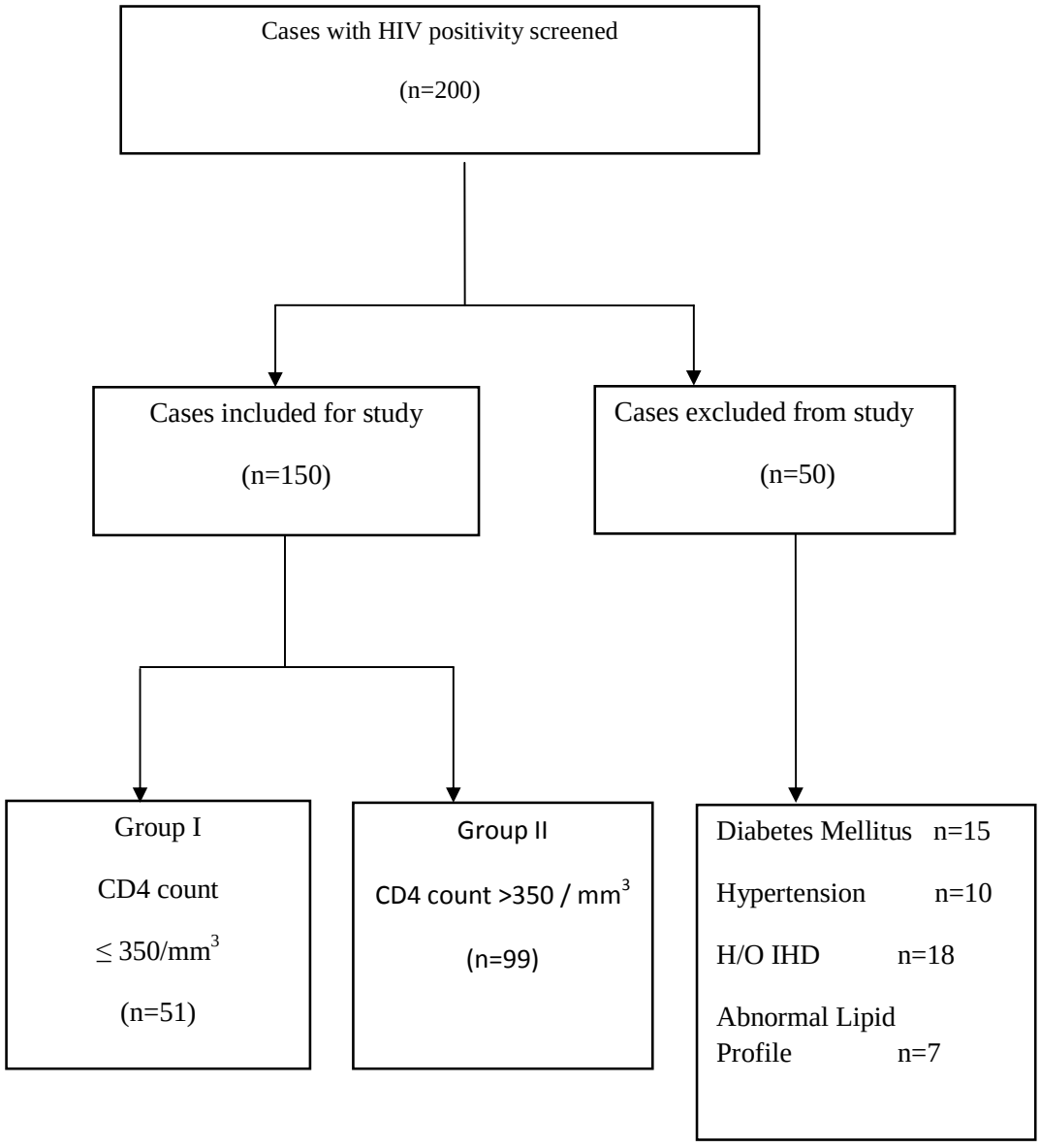
### EXCLUSION CRITERIA

1. Age less than 18 years and more than 55 years
2. Treatment with anti-retroviral drugs or any cardio toxic drugs
3. Diabetes
4. Hypertension
5. Previous congenital or acquired heart disease
6. Neoplastic diseases
7. Family history of cardiovascular diseases
8. Patients having lipid profile abnormalities.

**CLINICAL EXAMINATION FOCUSED IN THE STUDY:** All patients were meticulously examined for the presence of anemia, cyanosis, clubbing, pedal edema, dyspnea, jaundice, generalized lymphadenopathy and skin and mucous membrane lesions. Respiratory rate, pulse rate, jugular venous pressure, blood pressure (both in supine and erect posture) were also recorded. A thorough clinical examination of the cardiovascular system, respiratory system, abdomen and central nervous system was done. CD4 count assay was done by Fluorescence Activated Cell Sorting (FACS). Two dimensional Echocardiography was done for all patients included in this study in Department of Cardiology, Kilpauk Medical College and Hospital, Chennai.

**STATISTICAL ANALYSIS:** Statistical analysis was done by using windows SPSS software (version 11.5). Chi square test was applied for significance. "P" value less than 0.05 was considered as significant.

**FLOW CHARTCASE SCREENING**



## RESULTS

**TABLE: 1SHOWS THE GROUPS OF HIV PATIENTS BASED ON CD4 CELL COUNT**

| CD4 GROUP | NUMBER OF PATIENTS | CD4COUNT CELLS/mm $^3$ | MEAN CD4 COUNT CELLS/mm$^3$ |
|---|---|---|---|
| I | 51 | ≤350 | 261.08±83.75 |
| II | 99 | >350 | 582.69±191.24 |
| TOTAL | 150 | | 473.34±223.20 |

**Legend: 1** A total of 150 HIV seropositive patients were studied. They were divided into two groups. Group I included 51 HIV seropositive patients with CD4 cell count ≤ 350 cells / mm3 (n=51).Group II included 99 HIV seropositive patients, with CD4 count > 350 cells / mm3 (n=99).Mean CD4 count of study population was 473.34 ± 223.20 cells / mm3 (Group I - 261.08 ± 83.75 cells / mm3; Group II was 582.69 ± 191.24 cells / mm3). Out of 150 patients, 62 (41.3%) were males (Group I - 30; Group II - 32) and 88 (58.7%) were females (Group I – 21; Group II – 67).Mean age of study group was 30.87 ± 6.11 years (Group I - 31.43 ± 6.23 years; Group II - 30.58 ± 6.06 years)

**TABLE: 2 SHOWS THE ECHOCARDIOGRAPHIC FINDINGS AMONG HIV POPULATION**

| ECHOCARDIOGRAPHY | CD4 GROUP I | CD4 GROUP II | TOTAL |
|---|---|---|---|
| *Pericardial Effusion* | 7 (43.75%) | 2 (12.5%) | 9 (56.25% |
| *Dilated Cardiomyopathy* | 4 (25%) | 1 (6.25%) | 5 (31.25% |
| *Septal Hypokinesia* | 1 (6.25%) | 0 (0%) | 1 (6.25%) |
| *Infective Endocarditis* | 1 (6.25%) | 0 (0%) | 1 (6.25%) |
| **Total** | 13 (81.25%) | 3 (18.75%) | 16 (100%) |

**Legend: 2** Sixteen patients Out Of 150 HIV Patients Have Echocardiography abnormalities.

**TABLE: 3 SHOWS THE ECHOCARDIOGRAPHIC CHANGES IN RELATION TO CD4 COUNT**

| ECHOCARDIOGRAPHY | CD4 GROUP I | CD4 GROUP II | TOTAL |
|---|---|---|---|
| NORMAL | 38 (25.3%) | 96 (64%) | 134 (89.3%) |
| ABNORMAL | 13 (8.7%) | 3 (2%) | 16 (10.7%) |
| **TOTAL** | 51 (34%) | 99 (66%) | 150 (100%) |

**Legend: 3** There was a statistically significant difference noted between two groups regarding echocardiographic abnormalities (P <0.05). Prevalence of echocardiographic abnormalities increased with decline in CD4 count.

## DISCUSSION

Cardiovascular manifestations of HIV infection have not attracted much attention in the Indian sub-continent. This is partly because of the clinical picture of HIV infection still dominated by opportunistic infections and symptoms of breathlessness, fatigue and poor exercise intolerance are frequently ascribed to other conditions associated with HIV infection. With the greater access to Anti-retroviral medications more patients may live longer enough to present with end organ disorders.

Our study throws light into various unsuspected cardiac abnormalities in various groups of HIV infected patients and its relationship to CD4 count.Prevalence of cardiac abnormalities by echocardiography in our study was 10.7% (8.7% in Group I and 2% in Group II). Echocardiographic findings were pericardial effusion (56.25%), dilated cardiomyopathy (31.25%), interventricular septal hypokinesia (6.25%) and infective endocarditis (6.25%). Group I revealed 81.25% (13/16) cases and Group II revealed 18.75% (3/16) cases with echocardiographic abnormalities. P value was 0.000, statistically significant. There was a significant relation between CD4 count and echocardiographic abnormalities. In a study by Joshi et al, among 74 patients 10.6% had dilated cardiomyopathy, 8.5% had pericardial effusion, 4.2% had vegetation, 2.1% had constrictive pericarditis and 10.6% had incidental valvular, left ventricular hypertrophy, ischemic heart disease[6]. In a study by Mishra et al at AIIMS, 36.7% had diastolic dysfunction and 23.3% had systolic dysfunction[8]. In P Kannan ET alstudy, out of 200 patients, 28 patients had left ventricular dysfunction, 20 patients had pericardial effusion, 6 patients had pulmonary hypertension and one patient had dilated cardiomyopathy[9]. In Mirri A et al study, prevalence of echocardiographic abnormalities was 17% [10].

## CONCLUSION

The determination of Incidence and Prevalence of Echocardiographic abnormalities in HIV infected individuals using non-invasive tests is quite feasible and should be done in all patients registering in ART Centre. There was an inverse relation between CD4 count and cardiac abnormalities. Decline in CD4 count below 350 cells / $mm^3$ was associated with increased incidence of cardiac abnormalities.

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