ORIGINAL ARTICLE

A STUDY TO DETERMINE THE PREVALENCE OF CARDIAC DISEASE IN HIV POSITIVE PATIENTS IN A TERTIARY CARE HOSPITAL

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ABSTRACT: INTRODUCTION: Acquired immune deficiency syndrome was recognized as an emerging disease only in the early 1980's. The disease has rapidly established itself throughout the world and may persist well into the 21st century. Infection with human immunodeficiency virus is one of the leading causes of acquired heart disease and specifically of symptomatic heart failure. The cardiac complications of HIV infection tend to occur late in the disease and as patients with HIV infection are living longer, they are at risk of developing chronic diseases including coronary artery disease. Hence, clinicians should identify the risk factors for such disease and also be aware of the various cardiovascular manifestations of HIV infection. **AIM AND OBJECTIVES**: To find out prevalence of cardiac disease by correlating clinical findings and echocardiographic changes in HIV positive patients. **MATERIALS AND METHOD:** It is an observation type of study done in the Department of Medicine and anti retroviral therapy centre, King George Hospital, Visakhapatnam, Andhra Pradesh. It is a Tertiary Care Hospital. Fifty patients who were detected to be HIV positive were included in the study after fulfilling the inclusion and exclusion criteria. **RESULTS:** In this study, 15 patients constituting 30% of the total patients in the study had echocardiographic changes suggestive of cardiac disease with varied manifestations. **CONCLUSION:** Prevalence of heart disease increases with the duration of HIV illness. Patients with heart disease can be asymptomatic in early stages of the disease. So, periodic electrocardiographic and echocardiographic evaluation should be done at regular intervals from the time of diagnosis of HIV disease.

KEYWORDS: HIV, Echocardiogram, Electrocardiogram, Cardiac disease.

INTRODUCTION: Acquired immune deficiency syndrome was recognized as an emerging disease only in the early 1980's. AIDS was first recognized in the United States in the year 1981 when the U.S. Centers for Disease Control and Prevention (CDC) reported the unexplained occurrence of pneumocystis jiroveci (formerly P. Carinii) pneumonia and of Kaposi's Sarcoma with or without P. Jiroveci pneumonia in previously healthy homosexual men in New York and Los Angeles and later even in recipients of blood transfusion and hemophiliacs. The disease has rapidly established itself throughout the world and may persist well into the 21st Century. AIDS has evolved from a mysterious illness to a global pandemic which has infected tens of millions in less than 20 years. Human Immunodeficiency Virus belongs to the family of human retroviruses (Retroviridae) and the subfamily of lentiviruses. HIV is of two types HIV 1 and HIV 2. Most common cause of HIV disease throughout the world is HIV-1. By definition, any HIV infected individual with a CD4 T cell count of less than 200/microliter has AIDS, regardless of the presence of symptoms or opportunistic diseases. Aberrant immune activation is the hallmark of HIV

infection and is a critical component of the pathogenesis of HIV disease. In addition to endogenous factors such as cytokines, a number of exogenous factors such as other microbes that are associated with heightened cellular activation can enhance HIV replication and thus may have important effects on HIV pathogenesis. Infection with the human immunodeficiency virus is one of the leading causes of acquired heart disease and specifically of symptomatic heart failure. The cardiac complications of HIV infection tend to occur late in the disease and are therefore becoming more prevalent in our society as therapy and longevity improve. It was found that HIV positive people were prone to fat metabolism disorders especially, those with advanced immune deficiency were observed to have high triglyceride levels and low cholesterol and both LDL and HDL. It has been found that chronic HIV infection itself increases heart disease risk. Certain cytokines such as alpha interferon and tumor necrosis factor that may be present at high levels in people with HIV appear to interfere with lipid metabolism. Chronic inflammation may contribute to atherosclerosis. In addition, HIV infection has been associated with cardiomyopathy. Also, people with compromised immune systems are more likely to develop heart infections, and injection drug users are particularly prone to endocarditis. Many people with HIV would have taken androgens and anabolic steroids to combat conditions such as wasting and abnormal body fat redistribution. These hormones can increase blood viscosity and may interfere with blood flow and increase the risk of high blood pressure. As patients with HIV infection are living longer, they are at risk of developing chronic diseases, including coronary atherosclerosis. Clinicians should identify the known risk factors for coronary disease in their patients with HIV infection and also should be aware of the various cardiovascular manifestations of HIV infection.

AIMS AND OBJECTIVES:

1. To find out the prevalence of cardiac disease in HIV positive individuals.
2. To determine the correlation between clinical findings and echocardiographic changes in HIV positive patients.

MATERIALS AND METHOD:

- The study was performed in the Department of Medicine, Andhra Medical College, King George Hospital, Visakhapatnam.
- It is an observational type of study.
- Fifty patients who were detected to be HIV positive were included in the study.
- The patients were selected from the Anti Retroviral Therapy Centre and General Medicine ward.
- The HIV serology of the study population was done by double Enzyme Linked Immuno – Sorbent Assay (ELISA) using microwell ELISA Test.

METHODOLOGY: All patients were questioned for the following,

1. Symptoms suggestive of cardiac illness i.e. chest pain, palpitations, shortness of breath, syncope, swelling of lower limbs, abdominal distention and decreased urine output. The duration of each symptom was noted.
2. History regarding sexual exposures, abuse of intravenous drugs, prior blood transfusions, occupation and marital status.

3. Detailed and complete general examination for the presence of anemia, cyanosis, clubbing, icterus, generalized lymphadenopathy and pedal edema. The pulse, respiration and blood pressure were recorded.
4. A thorough cardiac examination which included jugular venous pressure and waveforms, apical impulse, presence of thrill and palpable sounds, the intensity of heart sounds, presence of added sounds and murmurs was carried out. The respiratory system, central nervous system and abdomen were also examined.
5. Complete blood count, blood urea, blood sugar, serum creatinine, liver function tests, urine routine analysis and ultrasonography of the abdomen and pelvis were done for all patients. Fasting serum lipid profile was done for patients above the age of forty. The CD4 lymphocyte count was done.
6. An erect chest x-ray on deep inspiration was taken and analyzed for cardiomegaly, pleural effusions, pulmonary hypertension and pulmonary edema.
7. A standard 12 lead resting electro-cardiogram was done for all patients. The various aspects of the P wave and the QRS complexes, ST-T changes and other electro-cardiographic features suggestive of pericarditis, myocarditis, pericardial effusions, pulmonary hypertension and left ventricular dilatation is noted.
8. Two dimensional echocardiography with colour flow doppler was done for all patients. Echocardiogram was done to evaluate the presence of pericardial effusion, chamber dilatation, myocardial dysfunction, ejection fraction, pulmonary hypertension, and valvular lesions.

INCLUSION CRITERIA:

- HIV seropositive patients, seropositivity being confirmed by ELISA.

EXCLUSION CRITERIA:

- Patients on treatment with highly active anti – retroviral therapy (HAART)
- Patients with Hyperlipidemia, Systemic Hypertension, Diabetes mellitus, Ischemic Heart Disease, Congenital Heart Disease, collagen vascular disease.

RESULTS: This study was done on 50 patients, all patients with age between 20 to 40 years of which 32(64%) were males and 18 (36%) were females.

Sex	20 – 40 years	%
Males	32	(64%)
Females	18	(36%)

Table 1: Distribution of Patients According to Age and Sex

S. No.	Symptoms	No. of Patients
1.	Breathlessness	25

2.	Palpitation	19
3.	Chest Pain	17
4.	Pedal edema	4
5.	Cough	4
6.	Decreased Urine output	1

Table 2: Distribution of patients according to symptoms

Sl. No.	Signs	No. of Patients
1.	Tachycardia	22
2.	Oropharyngeal candidiasis	14
3.	General lymphadenopathy	10
4.	Tachypnoea	9
5.	Pedal edema	3
6.	Pallor	2
7.	Clubbing	1
8.	Fever	1
9.	Cyanosis	--
10.	Icterus	--

Table 3: Distribution of patients according to signs on general examination

Sl. No.	Cardiac examination	No. of Patients
1.	Loud P2	4
2.	Elevated JVP	3
3.	S3	3
4.	Shift of apical impulse	2
5.	Pericardial Rub	2
6.	Systolic murmur in the apex	1

Table 4: Distribution of patients according to signs of cardiac examination

Sl. No.	ECG Changes	No. of Patients
1.	Sinus tachycardia	20
2.	P Pulmonale	6
3.	Right bundle branch block	6
4.	Right ventricular hypertrophy	5
5.	ST – T changes	8
6.	Low voltage complexes	2
7.	Ventricular premature complex	2

Table 5: Distribution of patients according to ECG changes

Sl. No.	Echo findings	No. of Patients
1.	Pericardial Effusion	4
2.	Dilated LV and LV dysfunction	6
3.	Dilated RV	2
4.	Pulmonary hypertension	2
5.	Vegetations in valves	1

Table 6: Distribution of patients according to echocardiographic abnormalities

DISCUSSION: In this study, 15 patients had echocardiographic changes suggestive of cardiac disease, which constitutes 30% of the total patients in the study. In this study, 32 patients had symptoms of cardiovascular disease in the form of breathlessness, palpitation, chest pain, cough, swelling of both lower limbs and decreased urine output. The most common symptom of the patients who were in the study group is breathlessness. About 25(50%) patients complained of breathlessness of varying severity. Of the 25 patients, 23(92%) had ECG changes in the form of sinus tachycardia, P pulmonale, RBBB, RVH, ST-T changes and 12(48%) patients who had breathlessness had echocardiographic manifestations in the form LV dysfunction and pulmonary hypertension. Palpitation was the second common symptom is the study group. 19(38%) patients had palpitations of which 18(95%) had ECG manifestations in the form of sinus tachycardia, P pulmonale, RBBB, ST-T changes. 10(53%) patients had varied echocardiographic manifestations. 17(34%) patients complained of chest pain, out of which ECG changes were observed in 14(82%) patients and 10(59%) patients showed echocardiographic changes. ECG changes were observed in 27(84%) patients who were symptomatic. Most common ECG finding was sinus tachycardia seen in 20 (40%) patients.

Sinus tachycardia was not only due to cardiac disease but associated with other conditions like fever, anemia, overt myocardial dysfunction. Isolated persistent tachycardia could be an early feature of myocarditis. ST-T changes were seen in 8(25%) of symptomatic patients. Of these 6 patients had echo findings suggestive of dilated LV or LV dysfunction, one patient had minimal pericardial effusion and 2 patients had normal echocardiogram. These ST – T changes may be due to myocardial involvement. The possibility of coronary artery disease should also be considered as angiogram was not done to reveal vessel blocks. Right bundle branch blocks were observed in 6 patients, 3 patients had normal echocardiogram, 1 patient had pulmonary hypertension, 1 patient had dilated RV and LV dysfunction and one patient had tricuspid valve vegetations. P Pulmonale in 6 patients and right ventricular hypertrophy were observed in 5 patients. These patients had RA, RV enlargement, pulmonary hypertension in echocardiogram.

Ventricular premature complexes were seen in 2 patients. This may be due to HIV associated myocarditis and it is the most common arrhythmia in HIV infected individuals as suggested by Barbaro G et al.[1] Low voltage complexes were observed in 2 patients of which only one had pericardial effusion in echocardiogram. Analysis of echocardiographic findings showed presence of pericardial effusion in four patients and all the four patients presented with breathlessness, chest pain, palpitation. Follow up echocardiogram after two months revealed complete resolution of the effusion. None of the patients had massive effusion or pericardial

tamponade requiring pericardiocentesis. Jose Silva – cardoso[2] et al showed that 41% of patients in his study had minimal asymptomatic pericardial effusion, 13% had moderate to severe pericardial effusion and 0.55% had acute pericarditis. 6 patients had LV dysfunction with varying ejection fraction. All patients had symptom of breathlessness except one who presented with chest pain and palpitation. Patients who presented with breathlessness also had chest pain and palpitation. Rerk pattanapipat et al[3] showed that HIV is the underlying cause in 4% of the patients with dilated cardiomyopathy.

Milei J et al[4] reported that dilated cardiomyopathy affects 10-20% of those with HIV infection and accounts for approximately a third of HIV related deaths. Herskowitz et al[5] in another study showed that global left ventricular dysfunction was detected by echocardiography in 15% randomly selected HIV patients. Out of 6 patients only one had signs of heart failure with an ejection fraction of 48% and was treated with HAART, ACE inhibitors and diuretics. All other patients had ejection fraction above 50% and did not have signs of heart failure. Pulmonary hypertension was noticed in 2 patients, 1 patient presented with breathlessness and palpitation with ECG showing sinus tachycardia, P Pulmonale and RVH. The other patient presented with chest pain, palpitation, swelling of both lower limb with ECG showing sinus tachycardia, p pulmonale, RBBB. Both the patients had prominent pulmonary artery in their chest x-ray. Studies by Sitbon et al[6] showed that oral endothelin receptor antagonist improved exercise tolerance and hemodynamic measurements in HIV patients.

The effects of HAART on pulmonary hypertension are unknown and further studies are needed to prove its effectiveness. Recent report from the Swiss cohort study by Zuber et al[7] showed a decrease in the pulmonary artery pressure with HAART. Patients who had cardiac disease as evidenced by echocardiographic changes were in between 29 and 39 years of age. Of the 15 patients who had echocardiographic evidence of cardiac disease 12 were males and 3 were females. Among the 15 patients with heart disease, 10 of them had disease for more than 30 months, suggesting longer the duration of the disease more severe the cardiovascular manifestations.

CONCLUSION: The prevalence of cardiac disease in HIV positive patients was 30% in this study. Among the various heart diseases in HIV positive patients, LV dysfunction was seen in maximum number of patients (12%). The prevalence of heart disease increases with duration of the HIV illness. All HIV positive patients who had heart disease echocardiographically had CD4 counts less than 500 cells/mm^3 Patients with heart disease can be asymptomatic in early stages of the disease. So periodic electrocardiographic and echocardiographic evaluation should be done at regular intervals from the time of diagnosis of HIV disease. All patients with symptoms suggestive of heart disease did not have cardiac lesions on echocardiogram. This may be due to the fact that symptoms of respiratory diseases and anemia in HIV disease can mimic symptoms of heart disease. Early diagnosis and treatment of cardiac lesions could improve the quality of life and longevity of HIV infected individual.

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