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Cardiovascular presentations of patients living with HIV/AIDS-A hospital based study in North Karnataka

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Abstract
Introduction: HIV is the major epidemiological heath issue globally. The prevalence of HIV is increasing steadily and reached 0.8% globally in 2014. HIV patients manifest a wide clinical spectrum of infection ranging widely from acute to prolonged cardiac abnormalities. HIV/AIDS is one of the predisposing factor for cardiac abnormalities. Hence, periodic cardiovascular screening among HIV/AIDS patients helps to prevent complications.
Objectives: To assess the cardiovascular presentations of patients living with HIV/AIDS.
Methodology: This study was a cross sectional hospital based study carried out among confirmed HIV/AIDS patients at Vijayanagara Institute of Medical Sciences, Bellary. Convenience sampling was used and all the patients attending ART centers, out of patient department and those admitted in the internal medicine wards during the study period who fit the inclusion criteria were taken for the study. The study was for a duration of 1 year during 2011-12.
Results: 200 Elisa positive HIV infected individuals were taken up for this present study over a period. 80% of the patients were males and 20% were females. Most of our patients belong to young age between 26 to 40 years. 74 percent of our patients had normal ECG. 21 patients (42%) had cardiac dysfunction, while 29 patients had no cardiac dysfunction, among the 50 patients taken up for the study. Pericardial effusion was the commonest abnormality.
Conclusion: Significant cardiac dysfunction is noted in HIV infected individuals. 2D ECHO cardio graphy is an important diagnostic tool for the evaluation of cardiac dysfunction in these patients. Hence, we suggest all HIV infected patients to undergo cardiac evaluation by 2D ECHO cardio graphy, at diagnosis and at periodic intervals.

Keywords: cardiovascular dysfunction, Hiv/Aids patients, cardiomegaly, cardiomyopathy

Introduction

Cardiac involvement in AIDS/HIV infected persons occurs frequently but may be quiescent clinically and may be a direct cause of death [1]. When patients are examined by echocardiography, cardiac abnormalities are detected more often than would be expected from clinical symptoms and physical examination. At autopsy 25-75% of HIV infected have been found to have cardiac involvement [2]. Dilated cardiomyopathy is an independent adverse prognostic factor. It is strongly associated with very low CD4 cell count.

Human immunodeficiency virus (HIV) belongs to Family of Retroviridae, Sub family Lentivirinae, Genus

Lentivirus Subtype CofM group of HIV-1 is the most common form prevalent worldwide and in India [3]. Persistent infection leads to hyperactivation of B-lymphocytes resulting in hyper gamma globulinemia. Activation of monocytes, CD4+T lymphocytes and CD8+T lymphocytes results in increase in pro inflammatory cytokines. Pro inflammatory cytokines increase the expression of HIV in infected cells. Viral multiplication and viral spread is more efficient in activated cells. Activation also induces viral expression and multiplication in latently infected CD4+T lymphocytes. The proportion of HIV infected CD4 + T cells in peripheral blood varies from 1 to 10000 in early infection to 1 in 100 cells in advanced stages [4]. HIV or its products like gp41 can induce polyclonal B-cell activation resulting in hyper gamma globulinemia. B cells are also functionally defective and respond poorly to immunization. These defects are partly responsible for increased susceptibility to certain bacterial infections [3]. It is a predictor of progression to AIDS independent of CD4+T lymphocyte count.

Measuring CD4+Tcell count reflects degree of immune deficiency and short term risk of opportunistic diseases whereas HIV RNA levels predict what is likely to happen to immune system [5].

Objectives

To study the Clinical Profile of Cardiac abnormalities in HIV/AIDS patients and its correlations.

Methodology

This was a cross sectional hospital based study carried out for a duration of one year from 2011-12 at Vijayanagara Institute of Medical Sciences, Bellary. Among patients admitted to the wards of internal medicine and patients attending ART centers and out of patient department. 200 seropositive HIV patients diagnosed by ELISA technique were analysed after obtaining a detailed clinical profile including sociodemographic profile, general physical examination along with cardiovascular screening which includes investigations like ELISA, ECG, ECHO and chest x ray. All the relevant findings such as echocardiography like of LV

internal dimension in systole [LVIDs] LV internal dimension in diastole [LVIDd] inter ventricular septal thickness in systole and diastole, fractional shortening [FS] and ejection fraction [EF] were studied. The participants were enrolled in the study after obtaining Ethical clearance from Institutional Ethical committee and informed consent from the participants. The Inclusion criteria for the study were patient aged more than 15 years and diagnosed with HIV/AIDS infection after SD Bioline, Triline and Tri-spot tests positive. While those with congenital heart diseases, preexisting valvular heart disease, hypertention, Diabetes Mellitus were excluded from the study.

Statistical analysis

The statistical software SPSS 11.0 and Systat 8.0 were used to analyse the data. The data are presented in the form of percentage, tables and graphs. Chi square test and odds ratio were used to check the statistical significance. While p value <0.05 was considered as statistically significant.

Table 1: Socio Demographic and Clinical Profile of Patients with HIV/AIDS

Age in years	Total	
	Number	Percentage
<25	28	70.0
26-30	48	24.0
31-35	56	28.0
36-40	44	22.0
>40	24	12.0
Total	100	100.0
ECG findings		
1. Normal	158	74.0
2. Tachycardia	36	18.0
3. Low voltage complexes	8	4.0
4. Ischemia Heart disease	4	2.0
5. Features of LVH	4	2.0
Pericardial Effusion (PE)		
Without PE	144	72.0
With PE	56	28.0
Mild	44	22.0
Moderate	8	4.0
Large	4	2.0
Cardiac Dysfunction		
Present	84	42.0

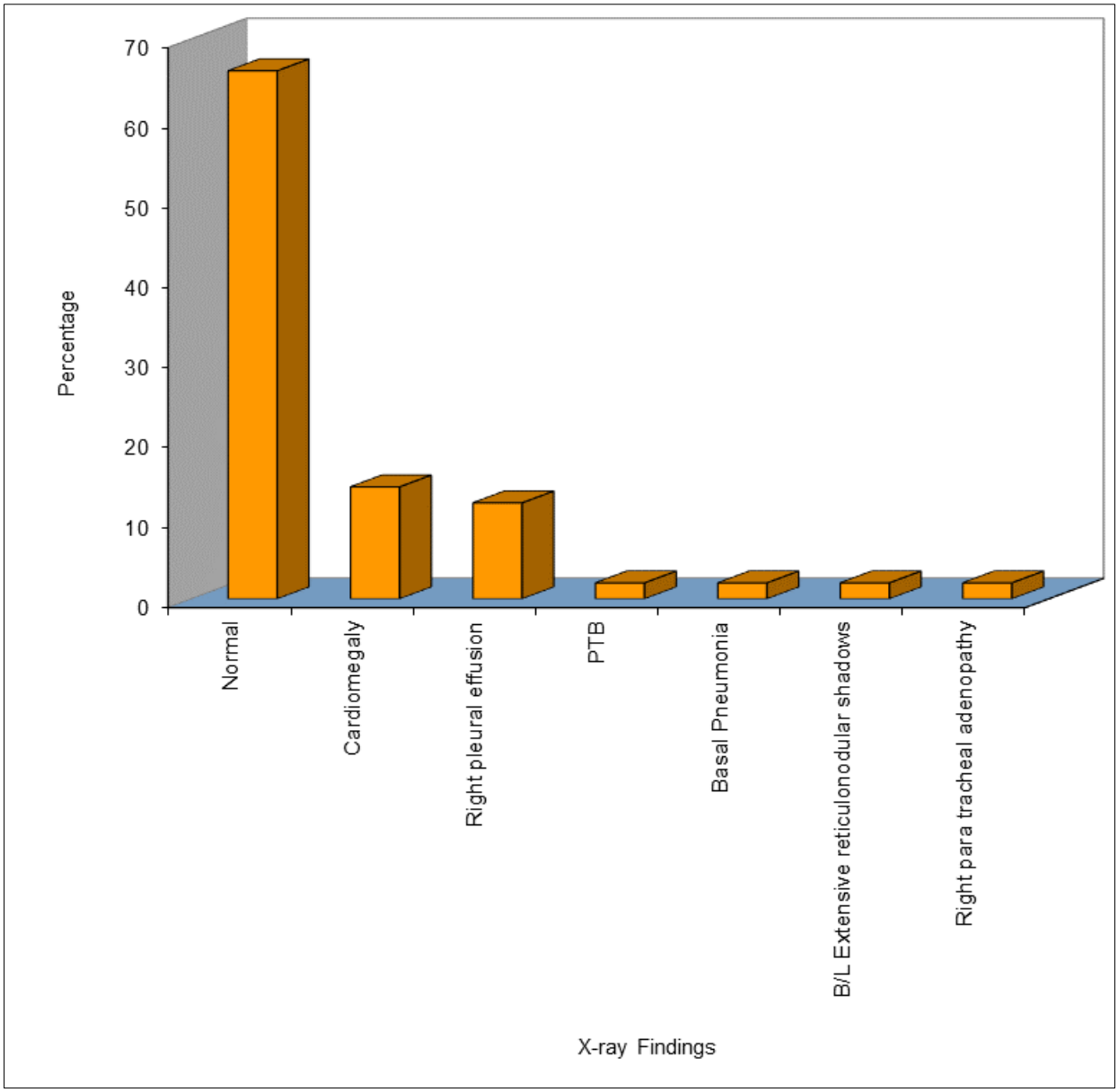

Fig 1

Table 2: ECHO abnormalities in HIV/AIDS infected individuals among different studies.

ECHO abnormalities	Present Study	Basvaraj Anita et al1	Moreno R etal13
Pericardial effusion	28%	45%	39%
DilatedCardiomyopathy	2%	-	6%
Systolic Dysfunction	6%	20%	7%
Diastolic Dysfunction	12%	10%	7.2%
Mitral Regurgitation	2%	-	6.8%
PulmonaryHypertension	14%	8%	9.6%
Clot	-	2%	-
Vegetation	-	-	2.6%

Results

200 Elisa positive HIV infected individuals were taken up for this present study over a period. Following are the results and observations were made during the study. Majority of the individuals were male comprising 80% and most of our patients were in an age group of 26 to 40 years.

The most common clinical presentation among our patients were fever (82%) and cough (82%) followed by Breathlessness (44%). While on examination pallor (80%) and pedal edema (68%) were the commonest finding followed by Lymph adenopathy (32%), Tachycardia (16%), Pericardial Rub (2%). Abnormal ECG was seen only among 26 % of the patients which consists of Sinus Tachycardia (18%), Low voltage complexes(4%) while Ischemic heart disease and LVH were 2%. 33 patients (66%) had normal chest x-ray. Commonest abnormality noted in chest x-ray in HIV individuals are Cardiomegaly (14%), Right pleural effusion (12%), 21 patients (42%) had cardiac dysfunction, while 29 patients had no cardiac dysfunction, among the 50 patients taken up for the study. Pericardial effusion was the commonest abnormality.

Discussion

Cardiomegaly and Pericardial effusion is one of the most common forms of cardiovascular involvement in HIV infection. There are varieties of clinical manifestations, which include asymptomatic pericardial effusion, pericarditis, cardiac tamponade, and constrictive pericarditis. Approximately one fifth of AIDS patients have pericardial effusion. The clinical manifestations of pericarditis are similar between patients with and without HIV infection.

Anderson *et al*. [6] suggested that myocarditis in HIV patients may play a role in the development of ventricular dysfunction. The autopsy incidence of myocarditis was approximately one third of all AIDS patients. A specific cause was found in less than 20% of these patients. Common pathogens in AIDS myocarditis include Toxoplasmagondii, Mtuberculosis, and Cryptococcus neoformans. Other infectious organisms have been reported to include Myocobacterium avium-intracellulare complex, Aspergillus fumigatus, Candida albacians, Histoplasma capsulatum. The viral load in the heart will increase from creating cellular reservoir for HIV. Apoptosis, anergy or both may cause T-lymphocyte depletion. Proliferation of the B cell may result in hyper gamma globulinemia. Autoimmune response may occur as a result of B-cell differentiation into immunoglobulin – secreting cells and activation of T-lymphocyte [7]. Recent data suggested that HIV alone can cause myocarditis. Either HIV or its proteins (p17, p24 and gp120/160) have been found in the heart specimens of patients with AIDS with or without cardiac diseases by culture, by in situ deoxy ribonucleic acid hybridization and Southern blot tests [8, 10].

Baroldi *et al*. [8] evaluated the relation between cardiac dysfunction and myocarditis. Among 26 patients with AIDS, 8 underwent pre mortem echocardiography. Of these 8 patients, 6 had abnormal cardiac function (abnormal fractional shortening, globular shape, hypokinesis, or mild ventricular dilation). All patients with abnormal echo cardio graphic findings had lymphocytic myocarditis with or without myocardial necrosis post mortem.

Herskowitz *et al*. [11] found that patients with severe symptomatic heart failure usually had a low CD4 cell count, myocarditis, and a persistent elevation of anti-heart antibodies. The postmortem gross findings of dilated cardiomyopathy in patients with AIDS have included increased heart weight, with either biventricular or 4-chamber dilation and a pale appearing myocardium [12].

Commonest ECHO cardio graphy abnormality noticed was pericardial effusion is 28% in present study, 45% in Basvaraj Anita *et al*. [1] and 39% in Moreno R *et al*. [13]. Other abnormalities are noted in present study is pulmonary hypertension 14%, Diastolic dysfunction 12%, Systolic dysfunction 6% which are on par with other studies.

Deficiencies of micronutrients including selenium and carnitine are reversible causes of cardiomyopathy and should be considered in HIV-infected patients with left ventricular dysfunction [14, 15] Recent reviews of works in adults without HIV infection have concluded that flow-mediated dilation is abnormal in atherosclerotic vessels, and that abnormal dilation is associated with cardiovascular risk factors and may be a marker of preclinical disease [16, 17].

Steven E. Lipshultz [18] found that left ventricular diastolic dysfunction is common in HIV-infected children. The clinical significance of this dysfunction in these patients is not entirely clear, but in other patient groups diastolic dysfunction is a primary or contributing cause of 30-60% of cases of congestive heart failure. The mechanisms regulating myocyte active relaxation, passive elasticity and stiffness, and early and late diastolic ventricular filling (e.g., increased left ventricular wall thickness and fibrosis or myocardial ischemia) in HIV- infected patients have not been well studied. However, abnormalities of these basic mechanisms relate to the clinical diastolic dysfunction syndrome.

Conclusion

Commonest affected with HIV infection were young male between age group of 26 - 40yrs. Commonest symptoms noted were fever, cough and Breathlessness 44%. Clinical signs noted were pallor followed by pedal edema and lymphadenopathy. Commonest ECG abnormalities seen were being sinus tachycardia. Chest x-ray abnormalities noted were cardiomegaly, pleural effusion, and pulmonary tuberculosis.

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