

## Cardiac & Renal Disease in HIV Patients And Their Correlation With CD<sub>4</sub> Count

Isha sood\*, Gaurav Kasundra\*

\*Senior Resident, Department of Medicine, Baroda Medical College, Vadodara

**Abstracts: Objectives:** The introduction of Anti retroviral therapy (ART) for HIV disease has significantly modified the quality of life and lengthened survival of HIV infected patients. Cardiac and renal disease may be direct consequence of HIV infection, due to opportunistic infection or related to drug toxicity. Aim of our study is to determine prevalence of the cardiovascular and renal manifestations in HIV infected patients and their correlation to CD4 count. **Methods:** A cross sectional study was carried out over a period of 2 years at Shri Sayajirao General Hospital and Medical College Baroda. 200 consecutive HIV patients attending medical outpatient department and those admitted were screened using ECG, 2-D Echocardiography, urinary albumin, serum creatinine, serum cholesterol and sonography kidneys. CD4 count was done in all patients. Patients with echocardiography evidence of ischemic heart disease, left ventricular dysfunction, decreased ejection fraction, pericardial effusion and pulmonary hypertension were included in cardiac group. All patients with urinary albumin more than 3 gram, normal or enlarged kidney on ultrasound with or without raised creatinine were included under HIV associated nephropathy group. Renal biopsy was done in one such patient to establish the diagnosis. **Results and Interpretation:** Of total 200 patients screened, 20 patients had cardiac disease (10%), 22 renal disease (11%) while 2 had both. On further analysis in cardiac group, dilated cardiomyopathy (45%) was the most common. Similarly, among those with renal disease, HIV associated nephropathy (31.8%) was the most common. CD4 count showed that 27(67.5%) of 40 patients had CD4 count below 100. [ Sood I NJIRM 2014; 4(1) : 50-53]

**Key Words:** ART-Anti Retroviral Therapy, Cardiovascular, CD4, Human Immunodeficiency Virus –HIV, Renal

**Author for correspondence:** Dr. Isha Sood, A-702, merigold , ram-mandir road, wazira naka , borivali west, Mumbai,400092, e- mail: ishaplp@gmail.com

**Introduction** AIDS was first recognised in summer of 1981 in The United States when the U.S. Centers for Disease Control and Prevention reported the unexplained occurrence of Pneumocystis jiroveci pneumonia in five previously healthy homosexual men in Los Angeles.

In 2007, data show that about 33 million individuals throughout the world are now infected with the HIV, the causative agent of AIDS. Of these, a large proportion is expected to die within 5-10 years of acquiring the infection. The high case fatality rate is mainly due to opportunistic infections.<sup>1</sup>

Diseases of the kidney may be a direct consequence of HIV infection, due to an opportunistic infection or neoplasm, or related to drug toxicity. HIV-associated nephropathy was first described in intravenous drug abusers and was initially thought to be intravenous drug abusers nephropathy; it is now recognized as a true direct complication of HIV infection.<sup>2, 3</sup> Among the drugs commonly associated with renal damage in HIV patients are pentamidine, amphotericin, adefovir, didanosine, tenofovir, and foscarnet. One of the most

common drug-induced renal complications is indinavir-associated renal calculi.

Heart disease is a relatively common post-mortem finding in HIV-infected patients (25–75% in autopsy series). Cardiovascular disease may be seen as a direct consequence of HIV infection or as a consequence of Anti retroviral therapy, as part of the lipodystrophy syndrome. As a primary consequence of HIV infection, the most common clinically significant finding is a dilated cardiomyopathy. A variety of other cardiovascular problems are found in patients with HIV infection include pericardial effusions, nonbacterial thrombotic endocarditis.<sup>4,5</sup>

Recent data suggest a linear relationship between time on Highly active anti retroviral therapy (HAART) and development of ischemic heart disease. This small increase in the risk of death from MI in the setting of HAART has to be balanced against the marked increase in overall survival brought about by HAART. Among various studies conducted, renal manifestation in HIV infected patients have never been studied in Indian population and there are only few studies of

cardiac manifestation. We have studied these manifestations in Indian population.

**Material and Methods:** A total of 200 patients were screened from both indoor and outdoor patients, admitted in Shri Sayajirao General Hospital between November 2008 and November 2010. Among them a sample of 40 patients was obtained who had either cardiac, renal disease or both. Cardiac manifestations were seen in 20(10%) while renal were seen in 22 (11%) patients, 2 patients had both cardiac and renal disease. It is a cross-sectional study where in patients freshly detected HIV or already on ART were included. Patients of renal manifestations were included based on urinary albumin, raised serum creatinine, and USG findings of enlarged or normal kidney with raised echogenicity. All patients with urinary albumin more than 3 gram, normal or enlarged kidney on ultrasound with or without raised creatinine were included under HIV associated nephropathy group. For cardiac manifestations echocardiography was performed in all symptomatic and asymptomatic patient keeping in mind the fact that cardiac disease was found in many patients post mortem who were previously asymptomatic for same.

Patients under the age of 12 years and those already diagnosed with diabetes mellitus, hypertension, cardiac illness or renal disease prior to diagnosis of HIV were excluded from the study population. CD4 cell count in every patient was done and classified according to WHO immunological classification for established HIV infection. Value of CD4 counts below 200/ $\mu$ L were further subdivided into 100-199, 50-99 and below 50/ $\mu$ L

**Result:** As described in Table-I, in this study, 34 (85%) patients were males as compared to 6 (15%) were females. Male to female ratio was 17:3. Table IV describes, of total renal patients, 7 (31.8%) out of 22 fulfilled the criteria for HIV associated nephropathy, while 4 (18.1%) had obstructive uropathy and rest of 11 (50%) of patients either had chronic kidney disease not fulfilling the criteria of HIV associated nephropathy or were in acute renal failure and one had pyelonephritis.

**Table I: Age and sex distribution of 40 sero-positives HIV infected patients with cardiac and renal manifestations**

Age/Sex	Male		Female	
	No.	%	No.	%
12-20	0	0	1	2.5
21-30	9	22.5	1	2.5
31-40	8	20	2	5
41-50	10	25	1	2.5
>50	7	17.5	1	2.5
Total	<b>34</b>	<b>85</b>	<b>6</b>	<b>15</b>

**Table II: Sex and age distribution among cardiac patients**

Age/sex	male		female	
	No.	%	No	%
12-20	0	0	1	5
21-30	5	25	1	5
31-40	4	20	0	0
41-50	4	20	0	0
>50	4	20	1	5
Total	17	85	3	15

**Table III: Sex and age distribution among cardiac patients**

Age/sex	male		female	
	No. of patients	%	No. of patients	%
12-20	0	0	0	0
21-30	4	18.8	0	0
31-40	4	18.8	2	9
41-50	8	37.6	1	4.5
>50	3	13.6	0	0
Total	19	86.6	3	13.5

**Table IV : Renal manifestation and their frequency**

Renal Manifestation	No. of patients	Percentage %
HIV associated nephropathy	7	31.8
Obstructive nephropathy	4	18.1
Others	11	50

Table-V describes, among cardiac manifestations dilated Cardiomyopathy being most common was seen in 9(45%) of patient followed by pericardial effusion 8(40%). Ischemic heart disease was seen

in 2(10%) and primary pulmonary HT in 1(5%) of patient.

**Table V : Cardiac manifestations and their frequency.**

CARDIAC MANIFESTATIONS	No. of patients	Percentage %
Dilated Cardiomyopathy	9	45
Ischemic heart disease	8	40
Pericardial effusion	2	10
Primary pulmonary HT	1	5

**Table VI: CD4 count and cardiac manifestations -a correlation**

CD4 COUNT	No. of patients	Percentage%
< 99	15	75
100-199	3	15
>200	2	10

Table VI show of total 20 patients with cardiac involvement 15(75%) had CD4 count less than 99. 3(15%) had CD4 count of 100-199, while only 1(10%) had CD4 >200. This shows that cardiac manifestations are a late feature of HIV infection, and suggests that lower the CD4 count, greater the likelihood of the cardiac involvement.

**Table VII: CD4 count and renal manifestations a correlation**

CD4 COUNT	No. of patients	Percentage%
< 99	12	54.5
100-199	4	18.8
>200	6	27.2

As in table VII Of total 22 patients with renal manifestations 12(54.5%) had CD4 count less than 99, while 4(18.8%) had it in 100-199 range while 6(27.2%) had it >200. Considering the low CD4 count and renal and cardiac involvement, role of opportunistic infections in pathogenesis of these can be explained.

In Table-VIII, In the major study conducted by by Chioma Pedro Emem et al<sup>6</sup> on Nigerian population out of 400 patients studied 152(38%) fulfilled the criteria for HIV associated nephropathy, however histology revealed focal segmental glomerulosclerosis with collapse in this study.

In the study conducted by Steel-Duncan J et al<sup>7</sup> of 60 people on Jamaican children six patients (3%) fulfilled the criteria for HIVAN, five of whom were male. Median age a diagnosis was five years; all presented with advanced HIV disease, nephrotic syndrome or nephrotic range proteinuria and three with chronic renal failure. The authors found a lower incidence of HIV associated nephropathy as compared to our study, which could be explained due to fact that it was a paediatric study done in children less than 14 yrs. In another study conducted by Fernando et al<sup>8</sup> 24% of the patients were found to have CRF secondary to HIVAN

**Table VIII : Comparison of results of renal manifestations in HIV infected patient among various studies**

DIAGNOSIS	Steel Dunca n J. et al	Fernand o et al	Chiom a Pedro Emem et al	Our study
HIV associated nephropathy	3%	24%	38%	31.8 %
Obstructive uropathy	2%			18.1 %
others				50%

**Table IX : Comparison of results of CVS manifestations in HIV infected patient among various studies**

DIAGNOSIS	Himelm an et al	Hakim Et al	Corallo et al	Our study
Dilated cardiomyopathy	11%	31%	41%	45%
Pericardial effusion	10%	19%	38%	40%
Ischemic heart disease	-	-	-	10%
Primary pulmonary HT	-	-	-	5%
Mediastinal mass	1%	-	24.5%	-
others	-	10%	18%	-

Table-IX describes, in the study conducted by Himelman et al<sup>9</sup>, of total 70 patients (mean age group 37 yrs) 16 had cardiovascular findings in

which major findings included dilated cardiomyopathy in eight patients (11%), pericardial effusions in seven patients (10%) (one with impending tamponade), and mediastinal mass in one patient (1%). In the study by Corallo et al<sup>10</sup> of total 102 patients with cardiac manifestations in 42 (41%) there was a globular and poorly contracting LV which was dilated. 39 (38%) patients had pericardial effusion. In 4 patients, valvular endocarditic vegetation was shown, all of them were drug addicts, in 3 (2.9%) patients a cardiac mass was found which proved to be a localization of Kaposi's sarcoma in 2. 25 (24.5%) patients died; necropsy showed cardiac dilation, and thin LV walls in 18. In the study done by Hakim et al<sup>11</sup> 80 (51%) men and 77 women were studied (mean age 34.4 ± 8.5). CVS abnormalities were found in 79 (50%) patients: most common finding was dilated cardiomyopathy and left ventricular dysfunction seen in 47(31%), 9/157 isolated right ventricular dilatation and 30/157 (19%) pericardial disease (28 with effusions, three having tamponade). There were two cases of constrictive pericarditis and one of ascending aortic aneurysm.

In India among studies done by Aggarwal et al<sup>12</sup> most common manifestations (on 2D-Echo) were reduction in fractional shortening (18 patients, 34.6%), followed by left ventricular diastolic dysfunction (10 patients, 19.2%), global hypokinesia (8 patients, 15.4%) and pericardial effusion (6 patients, 11.5%).

**Discussion:** Cardiac and renal manifestations in HIV positive patients are seen in both, newly diagnosed, as well as in patients already on ART. They are seen in all age groups with a male preponderance (20-65yrs). Symptoms of cardiac and renal manifestations are similar to those of non HIV patients. CD4 count is less than 200 in majority of patients of renal and cardiac manifestations but cardiac manifestations are seen more in patients with CD4 count <100. In cardiac manifestations dilated Cardiomyopathy, Pericardial effusion, Ischemic heart disease, Pulmonary hypertension are seen as common presentations in descending order. In renal manifestations most of the patients had HIV associated nephropathy and had either enlarged or normal kidneys on Ultrasonography

**Conclusion:** Cardiac and renal manifestations in HIV patients are present at low CD4 count. Dilated cardiomyopathy being most common in cardiac group and HIV associated nephropathy in renal group.

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