

Lipid profile abnormalities in human immunodeficiency virus infected patients- a hospital based study

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ABSTRACT

The pandemic of Acquired Immunodeficiency Syndrome (AIDS) continues to take a tragic toll on the lives of people in South East Asia, Africa and rest of the world. The most common cardiovascular findings are nonspecific ST and T wave changes dyslipidemia and Human Immunodeficiency Virus (HIV) associated cardiomyopathy. This continues to be even more prevalent as an adverse effect of the HAART therapy. The rationale of the present study was to assess the prevalence of lipid profile abnormalities in a study population of Jharkhand (Eastern India) done in Rajendra Institute of Medical Sciences (RIMS), Ranchi, at the Department of Medicine. The analysis revealed that the total cholesterol was significantly lower for the cases compared to the control group. HDL and LDL cholesterol were significantly lower, whereas TC/HDL was significantly higher. 60% of our patients were having a CD₄ count less than 200. The lower the CD₄ count higher was the chance for the patient to have an abnormal lipid profile.

Keywords: Laryngeal mask airway, Endotracheal tube, Tracheal intubation, Hemodynamic response.

Introduction

Ever since it's discovery in 1981, HIV/AIDS has grown into a disease of alarming proportions. Approximately 50 million individuals are living with HIV/AIDS with an annual incidence of around 5 million. Slowly India is emerging as a nation with the largest number of people living with HIV/AIDS. HIV/AIDS is characterized by declining immunity. So these patients are predisposed to many opportunistic infections and malignancies that involve multiple systems. HIV infection is becoming one of the leading causes of acquired heart diseases and symptomatic heart failure. As therapy and longevity improve, cardiac complications of HIV are likely to become more prevalent in our society. A range of cardiac abnormalities has been suggested by autopsy studies which includes pericardial effusion, dilated cardiomyopathy and infective endocarditis[1,2]. Due to the prevalence of a different subtype [subtype – c] of HIV

and a unique population profile, any data on HIV infection from India is important. The present study involves evaluation of Lipid profile abnormalities in patients with HIV infection and is aimed at providing a baseline information in the study population involving patients from RIMS, Ranchi - Eastern India for the first time.

Aim and objectives

To study the lipid profile abnormalities in HIV infected patient population in eastern india.

Subject selection

HIV positive patients including males and females admitted in the Department of Medicine, RIMS, Ranchi were selected for the study, after having met the inclusion and exclusion criteria. All participants were counselled and an informed consent obtained.

Inclusion criteria

1. HIV positive patients within age group of 18 to 60 years.

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2. HIV infection confirmed by double ELISA.
3. HIV positive patients never having cardiovascular complaints or records prior to diagnosis of HIV.

Exclusion criteria

1. Subjects unwilling to participate in the study
2. Pregnant women
3. Subjects who are using Cholesterol lowering drug

Consent and confidentiality: HIV testing for the purpose of identification of cases and controls was undertaken after pre – test counseling and informed consent. The confidentiality of the test result was strictly maintained. The test result, name of the individual and address was kept in secrecy.

Study measures

ELISA

ELISA was the most commonly performed screening test. It is easy to perform, adaptable to large number of samples, is sensitive, specific and cost effective. All ELISA consist of either antigen or antibody (depending upon the principle) attached on a solid phase (matrix or support) and, incorporate a conjugate and substrate detection system. Viral antigens may be whole virus lysates, recombinant or synthetic peptides. The matrix can be “wells” or “strips” of a micro plate, plastic beads or nitrocellulose paper. Conjugates are most often antibodies (IgG, sometimes IgM and IgA also) coupled to enzymes (alkaline phosphatase or horse radish peroxidase), flouochromes or other reagents that will subsequently bring about a reaction that can be visualized. In case of enzyme conjugates the signal generated is a color reaction. The substrates used are 4 – nitrophenoyl phosphate for alkaline phosphatase and o – phynxylencdiaminedihydrochloride(OPD) and TMB for horse radish peroxidase, which produce color on being acted upon by the respective enzymes and the color can be either detected visually or measured on a ELISA reader as OD values. In doubtful cases confirmatory Western Blot analysis was performed.

Fasting lipid profile

Serum concentration of total cholesterol, HDL cholesterol, LDL cholesterol and triglycerides were estimated by semiautoanalyser of BAYER company, using separate kit for each of them in the biochemistry department of Rajendra Institute Of Medical Sciences.

- For Triglyceride : 1 ml of blood was centrifuged. Then 10 microlitre serum was mixed with 1 ml reagent.

- For total cholesterol: 10 microlitre serum taken after centrifugation and mixed with 1 ml of cholesterol reagent.
- For HDL estimation : 0.2 ml serum is mixed with HDL reagent (A) 0.2 ml to precipitate serum which is centrifuged at 2000 rpm for 10 minutes. 20 microlitre of the supernatant is again mixed with 1 ml HDL reagent (B). All the three samples were incubated at 37 degree Celsius for five minutes. Then the reading was taken.

*LDL Cholesterol was calculated using the FRIEDWALD formula, i.e. LDL cholesterol = Total cholesterol – (HDL cholesterol + TG/5)

Cut off values for diagnosis

1. Case definiton of aids

2. Two positive tests for HIV infection (by ERS) method and
3. Any one of the following criteria :
 - a) Significant weight loss (> 10% of the body weight) within last one month / cachexia (not known to be due to a condition other than HIV infection.) and Chronic diarrhea (intermittent or continuous) > one month duration or prolonged fever (intermittent or continuous) > one month duration.
 - b) Tuberculosis: Extensive pulmonary tuberculosis, disseminated, military, extra – pulmonary.
 - c) Neurological impairment preventing independent daily activities, not known to be due to a condition unrelated to HIV infection (e.g. trauma).
 - d) Candidiasis of the esophagus (diagnosable by oral candidiasis with odynophagia).
 - e) Clinically diagnosed life threatening, or recurrent episodes of pneumonia, with or without etiological confirmation.
 - f) Kaposi sarcoma.
 - g) Other conditions
 - Cryptococcal meningitis
 - Neuro toxoplasmosis
 - CMV retinitis
 - Pencilliummarneffeii
 - Recurrent Herpes Zoster and multi – dermatomal
 - Disseminated molluscum

2. Hypercholesterolemia

Total cholesterol more than 200 mg/dl.

3. Hypertriglyceridemia

Estimated triglycerides greater than 150 mg/dl.

4. Low HDL cholesterol

HDL cholesterol less than 40 mg/dl.
5.Elevated LDL Cholesterol
 LDL cholesterol greater than 130 mg/dl.

Observations

The study was conducted from June 2006 to October 2007. A total number of 51 cases and 51 controls were included in the study.

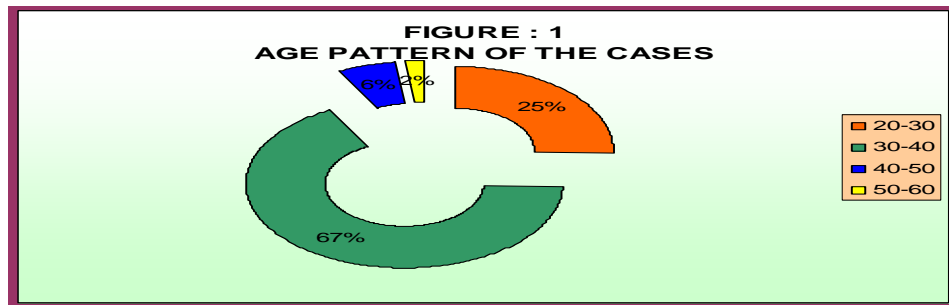


Figure 1: Age pattern of the cases

Age pattern of the cases

Cases were mostly in the 30-40 year age group. Most of these patients had a history of acquiring the infection at an age of 17-25 years. Our youngest patient was 20

years and a 55 year old male was the oldest one [Figure 1].

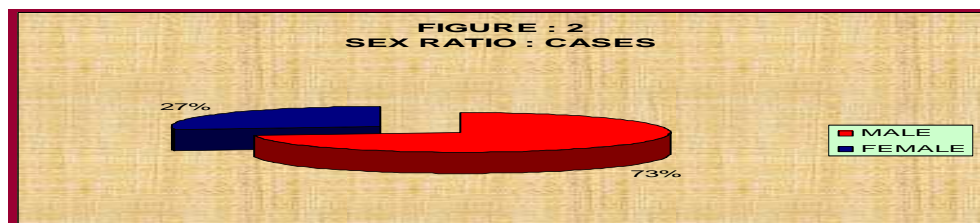


Figure 2: Sex ratio of the cases

Sex distribution of the cases

73% cases were males/All women were married to spouse carrying the infection [Figure 2]. This is important in its epidemiological aspect that most of them were having children and the infection was

transmitted directly to them. It also shows that an alarming number of children will be left without their parents, very early in their childhood.

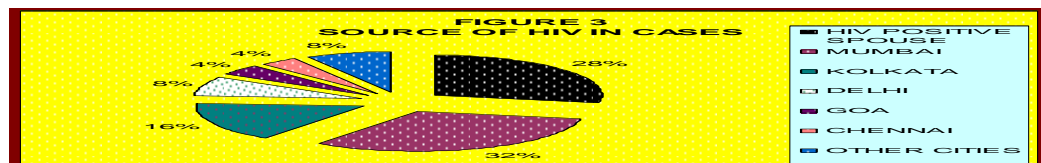


Figure 3: Source of HIV in cases

Sources of HIV in cases

The pie diagram shows that most of the patients who came to us gave a history of working in Mumbai, some patients had a history of travel to multiple cities [Figure

3]. Another important observation was that all of the women were infected with HIV got their infection from their infected spouses.

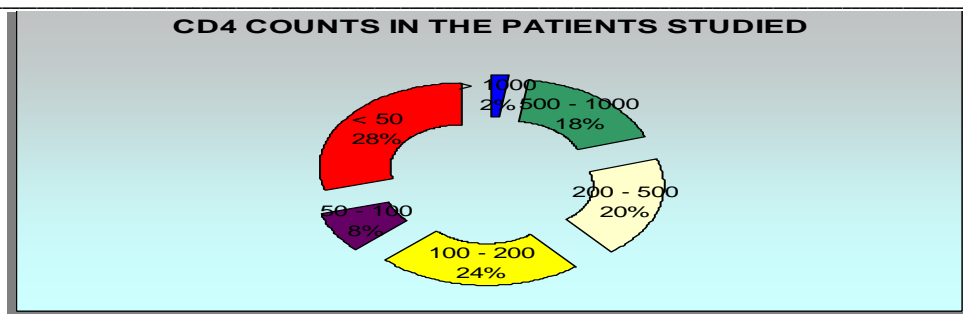


Figure 4: CD4 count in the patients studied

CD4 count in the patients studied

We had the maximum number of patients in the CD4 count < 50 cells/mm³ range [Figure 4]. This shows the

level of ignorance and the delayed access of these patients to a health care provider.

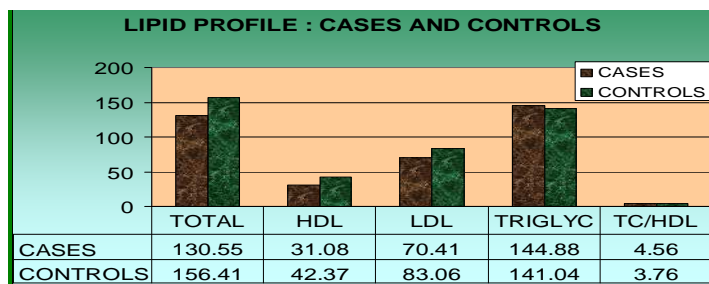


Figure 5: A comparison of the lipid profile of cases and controls

Comparison of lipid profile of Cases and Controls

We can see the markedly distorted lipid profile in the HIV infected patients by looking at the bar diagram. There is a marked decrease in the Total Cholesterol, HDL cholesterol, LDL Cholesterol without any

significant changes in the level of Triglycerides. The atherogenic milieu created is appreciated by seeing the markedly raised TC/HDL ratio [Figure 5].

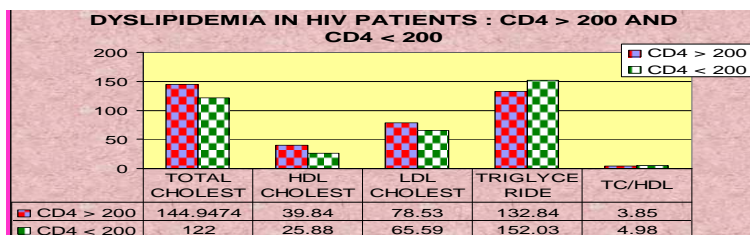


Figure 6: Dyslipidemia pattern in HIV infected patients

Dyslipidemia pattern in HIV infected patients

The HIV infected patients were again classified into two groups- Those with CD4 count > 200 and those with CD4 Count < 200. Observation was that HIV patients having CD4 count < 200 were having more severe derangements in their lipid profile [Figure 6].

Discussion

The study was conducted from June 2006 to October 2007. During this one and half year period 51 cases and 51 controls were enrolled for the study. The mean age of the cases was 32 years (max. – 55yrs; min. – 20yrs). The average age of the patients was 37 years in the study conducted by Himelman *et al*[1]. In the study

done by Hernandez *et al* the average age was 33.2 years[2]. The mean age of the controls was 34 years. 73% were males in the case group as well as the control group. In the study done by Minardi *et al* 78 % of the HIV patients were males[3]. In the study done by Hernandez *et al* 73 % patients were males[2]. In the study by Himelman *et al* 93 % were males[1]. In our study 28 % of patients were having a CD4 count < 50 cells/mm³, 8 % of patients were having a CD4 count between 50 and 100 cells/mm³, 24 % of patients were in the range of 100 – 200, 20 % of patients were having a CD4 count between 200 and 500. Only 20 % of patients were having a CD4 count greater than 500 cells/mm³. A total of 60 % of patients were having a CD4 count < 200 cells/mm³. The mean CD4 count in our study was 240 cells/mm³, much less than that of the cases studied in the western population. The mean CD4 count in the study done by Barbaro *et al* was 670 cells / mm³[4]. The mean CD4 count in the study done by Mittal *et al* was 426 cells/mm³[5]. Although the purpose of the study was to look into the lipid profile abnormalities in the subjects enrolled for the study, a detailed look into the epidemiological aspects was also done. The socioeconomic factors having a role in the case detection and treatment were taken into account. At the time of recruitment most of the patients were having some associated complaints and all of the controls were asymptomatic. A complete cardiovascular evaluation was done including clinical examination, electrocardiogram, fasting lipid profile and echocardiogram on all cases as well as controls. The findings of examination as well as the results of lab findings were entered on the proforma which was prepared.

Statistical tests were done on the results obtained from cases and controls. The analysis revealed that

- Total Cholesterol was significantly lower ($p < 0.001$) for the case (mean = 130.55) compared to the control group (mean = 156.41). An increase in the total cholesterol was found in the study done by Periard *et al*[6]. But this study was done in patients taking HAART.
- HDL Cholesterol was significantly lower ($p < 0.001$) for the case (mean = 31.08) compared to the control group (mean = 42.37). This has been reported in the study by Zahedi *et al* and Krishnaswamy *et al*[7-8].
- LDL Cholesterol was significantly lower ($p = 0.014$) for the case (mean = 70.41) compared to the control group (mean = 83.06). An elevation in LDL cholesterol was reported in the study by Cameron *et al*, but all the patients were on therapy with protease inhibitors[9].
- TC/HDL was significantly higher ($p < 0.001$) for the HIV positive patients (mean = 4.56) compared to the control group (mean = 3.76).
- The difference between those tested positive (mean = 144.88) and the control group (mean = 141.04) was not significant ($p = 0.725$) in the case of triglyceride. This is similar to that in the study done by Periard *et al*[6].

Conclusions

HIV positive patients with a CD4 count more than 200 were having few abnormalities in the lipid profile as well as echocardiography. Patients with a CD4 count less than 200 were having marked abnormalities in the lipid profile, electrocardiograms and echocardiography. Atherogenic dyslipidemia was present in high frequency in patients with a low CD4 count. There was a decrease in total cholesterol, HDL cholesterol and LDL cholesterol. But there was no significant change in the level of triglyceride. The level of total cholesterol – HDL ratio was considerably increased in the HIV positive patients.

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