

A STUDY OF 130 CASES OF HUMAN IMMUNODEFICIENCY VIRUS AND EFFECTS OF HAART ON VARIOUS HEMATOLOGICAL PARAMETERS



Medicine

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ABSTRACT

HIV is a pathogen that primarily attacks the immune system of its host. Stage of immunosuppression can be assessed by monitoring the CD4 count. Other hematological parameters are also affected by HIV. Highly active anti-retroviral therapy (HAART) is an effective treatment to contain and control the infection. This study puts in an effort to study the effects of HAART on various hematological parameters.

KEYWORDS

AIDS is a disease that has its roots in Africa. AIDS is caused by a Human retrovirus, which was initially discovered and isolated in 1983 from patients with persistent generalized lymphadenopathy at the "Institut Pasteur" in Paris.¹⁸

HIV is a manifestation of AIDS. HIV disease is a continuum of progressive damage to the immune system from the time of infection to the manifestation of severe immunologic damage by opportunistic infections, neoplasms, wasting or low CD₄ lymphocyte count that define AIDS. Nearly all infected persons have a CD₄ lymphocyte count below the mean for seronegative persons and show a progressive loss of these cells over time.²¹

The median incubation period from HIV infection until development of AIDS is estimated at approximately ten years for young adults.²²

HIV is transmitted by- sexual transmission, injection drug use, blood products, vertical transmission etc. In initial stages, after setting of infection and following the HIV antibody rise, levels of detectable virus, HIV RNA, and viral antigens in peripheral blood drop dramatically. Typically noted over this period is a drop in the CD₄ count, from normal levels to 200 to 300 cells/mm³. The frequently observed generalized lymphadenopathy syndrome is probably a manifestation of this process. As the disease advances further and the CD₄ count drops below 50 cells/mm³, additional opportunistic infections as well as central nervous system non-Hodgkin's lymphoma occur commonly, and, in homosexual males, existing Kaposi's sarcoma may become extensive and cause disfigurement and clinically significant edema. Death eventually results from extensive disease of vital organs, most commonly the lungs, and presumably from effects of circulating toxins, electrolyte abnormalities, hematopoietic and circulatory failure, and autonomic nervous system damage.

In India, HAART is started irrespective of CD4 count and disease stage.

Anemia is a very common finding in patients with HIV infection, particularly in individuals with more advanced HIV disease.

Condition	Solution
Marrow suppression by a drug	Withdraw suspected drug, such as zidovudine or trimethoprim-sulfamethoxazole, if possible; if the suspected drug is zidovudine, therapeutic EPO given concurrently will limit the degree of anemia
Anemia of chronic disease/inflammation	Treat infection, if possible; EPO may raise the hematocrit
Advanced AIDS (wasting syndrome)	Institution of effective antiretroviral program with suppression of opportunistic infections, if not already in place
Renal failure	Dialysis; therapeutic EPO
Severe anemia of any cause	Transfusion (consider EPO)

Red cell aplasia due to chronic parvovirus infection	Intravenous gamma globulin
Thrombotic thrombocytopenic purpura	Plasma exchange, steroids, platelet function inhibitors

Table 1: Conditions causing anemia in HIV infection and their solution

Also, granulocytopenia is a problem commonly encountered in patients with HIV infection. Although low granulocyte counts usually reflect the toxicity of therapies for HIV infection or associated conditions, studies of untreated patients have also shown a high incidence of granulocytopenia, particularly in patients with more profound immunodeficiency. The pathogenesis of granulocytopenia in patients with HIV infection is multifactorial. An autoimmune mechanism involving antigranulocyte antibodies⁸³ and impaired granulopoiesis^{40,41} has been postulated. Any infiltrative process involving the bone marrow (infection, malignancy) may also produce granulocytopenia. In clinical practice, however, drug toxicity is responsible for most of the granulocytopenia seen in patients with HIV infection.

Aims and Objectives:

To study the effects of HAART on various blood parameters.

Materials and Methods:

A retrospective, cross sectional study of 125 patients on HAART. This study was done in the Department of General Medicine, Rajendra Institute of Medical Sciences, Ranchi.

Inclusion Criteria:

All patients infected with HIV and on HAART

Exclusion Criteria:

Patients suffering from hematological and other malignancies.

Results:

130 patients were included in the study. Mean age of the population was 37±12.8 years. 96 patients (74%) were males while 34 patients (26%) were females. Hematological parameters (white blood cell count, absolute neutrophil count, absolute lymphocyte count and CD4+ T cell count) did not showed statistically significant change among males and females.

In our study ZDV+LMV+NVP combination was used in 90% of cases (117 aptients) followed by ZDV+LMV+EFV (10% cases) (13 patients).

STV+LMV+EFV was also used earlier but is obsolete these days. Also, these days the SLN+LMV+NVP combination is less frequently used because of the side effects.

Hematological parameters did not show statistically significant change after six month of HAART initiation. During the initiation of antiretroviral therapy, the mean hemoglobin, white blood cell count, absolute neutrophil count, absolute lymphocyte count and CD4+ T cell count of 130 HIV infected adult individuals were 10.65gm/dl IQR (6.2-14.2 gm/dl), 6418.40 cells/cumm IQR (2498-10242 cells/cumm), 3642.22 cells/cumm IQR (334-7624 cells/cumm), 2128.89 cells/cumm IQR (734.00-4195.00 cells/cumm) and 285.34 cells/cumm IQR (69.00-627.00) cells/cumm, respectively.

Parameters		Value	Statistical significance
Sex (n=130)	Male	96	p>0.05
	Female	34	
Mean age (in years)		3712.8	p>0.05
Mean Haemoglobin		10.65gm/dl	p>0.05
Mean WBC count		6418.40 cells/cumm	p>0.05
Mean Absolute Neutrophil Count		3642.22 cells/cumm	p>0.05
Mean Absolute Lymphocyte Count		2128.89 cells/cumm	p>0.05
Mean CD4- Lymphocyte Count		285.34 cells/cumm	p>0.05

Table 2: Table showing various parameters, their mean values and their statistical significance

DISCUSSION:-

Multiple hematological abnormalities including peripheral cytopenias are usually seen in patients infected with HIV (5). Out of 130 patients, 47% (n=61) cases were those with CD4+T cell counts <200 cells/cumm and CD4+ T cell count of < 50 cells/cumm was seen in 4% (n=5) of the patients, indicating the stage of severe immunosuppression. In contrast, with this other study conducted in India showed that 89.2% cases at the baseline were with CD4 count < 200 cells/cumm and CD4+ T cell count of < 50 cells/cumm was seen in 18.6% of the patients (20). Another study conducted at Saint Paul hospital, Addis Ababa Ethiopia which included 79 HIV positive hospitalized patients found that 83.5% of them had CD4+ T cell count < 200 cells/cumm and 35% had CD4+ T cell count <50 cells/cumm (21).

CONCLUSION:-

HIV is a serious illness which can be managed by highly active anti-retroviral therapy (HAART). Drugs commonly used for therapy includes lamivudine, zidovudine, efavirenz and stavudine. Regular monitoring of effectiveness of therapy can be done by measuring various blood parameters. However, this study suggests that these parameters take more than 6 months to change significantly.