Peer Reviewed, Open Access, Free
Published Quarterly
Mangalore, South India
ISSN 0972-5997
Volume 7, Issue 2; Apr-Jun 2008

Original Article

Impact Of Hepatitis C Co-Infection On CD4 Cell Count In HIV Infected Subjects

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Citation

Emokpae MA, Nwokedi EE, Jegede EE. Impact Of Hepatitis C Co-Infection On CD4 Cell Count In HIV Infected Subjects. *Online J Health Allied Scs.* 2008;7(2):3

URL

http://www.ojhas.org/issue26/2008-2-3.htm

Submitted: Jun 25, 2008; Accepted: June 29, 2008; Published: July 21, 2008

Abstract:

Background: Human immunodeficiency virus (HIV) and Hepatitis C virus (HCV) co-infection is reported to be common among HIV infected subjects due to share routes of transmission. The fact that HCV infection may act as cofactor for HIV disease progression has been suggested.

Objective: To determine if HCV and HIV co-infection affect the immunocompetence (CD4) of the infected subjects and response to Highly Active Anti Retroviral therapy.

Subjects and methods: Fifty HIV/HCV co-infected and fifty HIV monoinfected adults were retrospectively studied. Their baseline CD4 cell counts were done using Dynal beads technique before commencement of HAART and repeated after six months.

Results: The CD4 cell counts of co-infected subjects were lower than the mono-infected subjects. Sixty eight percent of the co-infected subjects had CD4 cell count less than 200cells/uL, and they responded poorly to HAART therapy than the mono-infected subjects ($P<0.05$). Those with CD4 cell count greater than 200cells/uL responded better to treatment than those with CD4 cell count less than 200cells/uL ($P<0.001$)

Conclusion: HCV/HIV co-infection affects the immunocompetence of the patients and HCV may acts as cofactor for HIV disease progression. It is needful to screen all HIV positive subjects for HCV antibody as this will improve their clinical management and outcome.

Key Words: Hepatitis C, Human Immunodeficiency virus, CD4 cell count, Co-infection

Introduction:

This study was aimed at determining if Hepatitis C(HCV) and Human Immunodeficiency virus (HIV) co-infection affect the immunocompetence (CD4) of the subjects and response to Highly Active Anti Retroviral Therapy (HAART). Co-infection with Hepatitis B or HCV is reported to be common among HIV infected subjects in various countries. In Nigeria, a prevalence of 6.2% of co infection of HCV and HIV was recently reported from this centre.(1) This is also true when compared with other parts of Nigeria.(2) Co infection prevalence of 12.5% was also reported among selected subjects in Abuja, Nigeria.(3) A co infection prevalence rates in Africa varies between 0.41 and 12 %(4). Recent reports suggest that the prevalence in normal Africans may be as high as 10.9% while the corresponding value for patients with primary liver cell carcinoma may be about 18.7 - 38%.(4) Similarly Backus et al(5) reported prevalence rate of 37% among high risk group in USA. They reported that co-infected patients were older, more likely to be men, more likely to be blacks or Hispanic and more likely to report intravenous drug use as a risk factor for HIV acquisition. Co infections by both viruses are frequent given the share routes of transmission. Before the introduction of HAART, in HIV management the impact of HCV was limited given the morbidity and mortality related to HIV infection.(6) In this era however, when there is significant decrease in morbidity and mortality amongst HIV infected patients, the expression of liver-related complications associated with HCV often occur. (1,3) There are however conflicting reports on the impact of HCV on HIV co-infection. According to recommendations from an international experts panel on care of patients with chronic HBV/HCV co infection, some authors reported that HIV disease outcomes following HAART do not appear to be adversely affected by HBV/HCV co-infection, while others said that even though HIV is known to worsen HCV liver disease the impact of HCV on HIV is not clear and no impact of HCV co-infection on HIV as well as overall mortality (7) HAART was not available in this country until the year 2002 when the Federal government of Nigeria introduced it to reduce the impact of HIV/AIDS. The CD4 cell counts of these patients treated with HAART were also not available in this centre until January 2002 when the government of Nigeria introduced the accelerated HAART trial in six centres in this country of which Aminu Kano Teaching Hospital was one. The impact of HCV-HIV co-infection on CD4 cell count is therefore presented.

Subjects and Methods:

One hundred newly diagnosed HIV positive adults, aged 20 years and above were retrospectively studied. They consist of fifty HIV/HCV co-infected and fifty HIV mono infected subjects. They were counseled and relevant confidentiality was maintained throughout the study. Informed consent was obtained from the patients. Inclusion criteria for enrolment of patients include: that patients must be male and female adults that is 20years and above, must have laboratory evidence of HIV and HCV co-infection, must not have history of having taken any form of antiretroviral therapy. Ten millilitres of blood was obtained from each patient and the specimens were analyzed to establish the baseline values of CD4 cell count. The samples were also used to confirm the serostatus of all patients tested outside the hospital.

The HIV serostatus was confirmed by testing each patient's serum using double rapid test kits Capillus (Trinity Biotech, Ireland), Genie II HIV 1 and 2 (Biorad, USA) and Immunocomfirm (Orgenics, Israel). HCV antibody testing was done using ELISA technique (HCV Murex 40, Anhet laboratories, USA).

Baseline CD4 cell count of each patient was determined using Dynal beads technique prior to commencement of HAART. The CD4 counts were repeated at six months interval after commencement of treatment and complete adherence to treatment by patients. The CD4 cell count of the co-infected patients was compared with HIV mono- infected subjects after six months interval respectively. The investigations were carried out before the commencement of the US president emergency plan for AIDS relief (PEPFAR) and Global Fund programs.

Results:

The CD4 cell counts of the 50 HIV/HCV co-infected subjects as well as 50 HIV monoinfected subjects before and after commencement of HAART are presented in Tables 1-3. The CD4 cells count of HIV/HCV co-infected was stratified based on the number of CD4 cells count. It shows that 15(30%) of the subjects had CD4 cell count of 0-99, while 19(38%), 12(24%) and 4(8%) of the patients had CD4 cells count of 100-199,200-299 and 300-399 respectively. It also shows that 34(68%) of the co-infected subjects had CD4 cells count below 200cells/ul while 16(32%) had CD4 cells count above 200cell/ul.

Table 1: Baseline CD4 cell count of HIV/HCV co-infected subjects					
CD4 cell count-Cell/ul	Age Interval				
	<20	20-29	30-39	40-49	Total(%)
0-99	-	10	5	-	15(30)
100-199	-	5	10	4	19(38)
200-299	1	5	2	4	12(24)
300-399	-	2	1	1	4(8)
Total (%)	1(2)	22(44)	18(36)	9(18)	50(100)

Table 2 shows the baseline CD4 cell count of HIV mono-infected naïve subjects. It shows that 6(12%) had CD4 cells count of 0-99, while 6(12%), 32(64%), and 6(12%) of the patients had CD4 cells count of 100-199, 200-299 and 300-399 respectively. Twelve 12(24%) of the patients had CD4 cells count below 200cells/ul while 38(76%) patients had CD4 cells count of above 200cells/ul.

Table 2: Baseline CD4 cell count of HIV mono-infected subjects					
CD4 cell count-Cell/ul	Age Interval				
	<20	20-29	30-39	40-49	Total(%)
0-99	-	5	-	1	9(12)
100-199	-	2	2	2	6(12)
200-299	1	12	16	3	32(64)
300-399	-	2	3	1	6(12)
Total (%)	1(2)	21(42)	21(42)	7(14)	50(100)

Table 3 shows the CD4 cells count of co-infected and mono-infected subjects before and after the commencement of therapy. The CD4 cells count of the 34subjects whose initial CD4 cells count was 182±18 cells/uL before the commencement of HAART therapy rose to 202±25-cells/uL after 6 months, while those of the 16 subjects whose CD4 cells count was initially 416±25cells/uL rose to 482±30 cells/uL after 6 months. A statistically significant difference was observed ($p<0.05$). For the HIV mono-infected subjects 12 of them who had CD4 cells count of 196±18cells/uL had their mean CD4 cells count appreciated to 219±22 cells/uL while those with mean CD4 cell count of 436±24ells/uL rose to 569±15 cells/uL after 6months. Statistically significant difference was also observed ($p<0.001$). When CD4 cells count of co-infected subjects were compared with mono infected subjects, a statistically significant difference was observed ($p<0.001$).

Table 3: CD4 Cell Count of HIV/HCV co-infected and HIV Mono-infected Subjects before and after HAART				
	Naive CD4 Count		6 Months on HAART - CD4 Count	p value
	<200	>200		
HIV/HCV Coinfected	(34) 182±18		202± 25	N/S
		(16) 416±25	482±30	p<0.05
HIV Monoinfected	(12) 192±18		219±22	N/S
		(38) 436±24	569±15	p<0.001
(Number of patients in parenthesis)				

Discussion:

The CD4 cell count of HIV/HCV co-infected naïve subjects were lower than those of HIV mono-infected patients. Similarly co-infected individuals responded poorly to HAART therapy than mono-infected subjects. These were in agreement with other authors (4,6,7) who observed poor response to HAART by HIV infected patients co-infected with HCV. The result also indicates that majority of the patients were diagnosed when their CD4 cell counts were below 200cells/uL. This was also in agreement with other investigators.(1,8) This calls for increased health education and expansion of voluntary counseling and testing among the populace. Because of frequency of co-infection of both viruses due to shared routes of transmission, there is need to screen all HIV infected individuals for hepatitis C. It was earlier reported that co-infection of HCV may influence the natural history of HIV. HCV may worsen the spontaneous evolution of HIV to both AIDS and death in affected subjects.(5) HCV infection has been reported as important factor in the morbidity and mortality in HIV infected subjects which may be due to impaired CD4 recovery in co-infected patients on HAART.(7,9,10) Several mechanisms as to why HCV may act as a cofactor for HIV disease progression have been suggested. These include non-specific immune stimulation enhancing HIV replication and CD4 cell depletion reflecting infection of immune cells by HCV.(7)

Those patients whose CD4 cells count were greater than 200cells/uL responded better to HAART treatment than those whose CD4 cells were less than 200cells/uL. These have been documented by workers elsewhere.(7-8) Similarly, the response of the HIV mono-infected individuals were better ($p<0.001$) than the co-infected subjects ($p<0.05$) to HAART.

Conclusions:

The CD4 cell count of HIV/HCV co-infected subjects were lower than the HIV mono-infected subjects and the mono-infected patients responded to HAARt better than the co-infected patients. It is needful that HCV antibody be screened in all HIV positive patients so as to ascertain the status of their co-infection or not. This will in turn influence their clinical management as well as outcome.

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