Clinical and immunological features of pediatric HIV positive patients prior to anti-retroviral therapy- A cross sectional study

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Abstract

Background: Human Immunodeficiency Virus (HIV) infection in children occurs in the context of an immature immune system, resulting in more frequent and severe opportunistic infection and rapid progress of HIV infection to AIDS(Aquired immunodeficiency syndrome). So there is a need for early suspicion, detection, and appropriate management of the HIV positive cases. So CD4 count is reliable indicators for the progression of infection, can be taken into account for early diagnosis and treatment. To Study the clinical features, stage at presentation with symptoms and corresponding CD_4 count prior to HAART (Highly Active Antiretroviral therapy). To know the correlation between CD4 count and clinical stage of HIV infection.

Methods: This is a cross sectional, descriptive, record based study. A total of 137 children with HIV positive were registered in the Anti Retroviral Therapy (ART) centre, Chigateri hospital, Davangere. Data was collected about the clinical presentation and corresponding CD_4 count prior to HAART from the register maintained in the ART centre. Chi-Square test, spearman's correlation test using SPSS 15.0 version.

Results: The 133(97.1%) were infected through the perinatal route, 3(2.1%) children with Heterosexual route and 1(0.8%) with blood transfusion. About 46(33.6%) of the children were presented with pneumonia and recurrent respiratory infection. 27(19.7%) children had pulmonary Tuberculosis. Age adjusted CD_4 count distribution in different stages with $p<0.003$ which is significant. By using spearman's correlation it shows negative correlation that as the CD_4 count decreases the stage of HIV increased.

Conclusion: CD_4 count can be considered for the staging purposes and for management of the cases, since it has a significant role for developing AIDS condition. HIV will progress fast in children due to immature immune system. A need to diagnose and find the HIV status of children with high degree of suspicion when the child presents with repeated infection.

Key words: Pediatric HIV, CD_4 count, clinical staging

Introduction

Every minute of every day, a child under the age of 15 is infected with HIV/AIDS. AIDS kills 1,400 children every single day and claims more than half a million young lives every year[1]. Pediatric AIDS threaten much of the progress made in child survival in developing countries over the past ten to fifteen years. More recent reports have described the clinical manifestations in children with perinatally acquired infection [2,3].

HIV infection in children occurs in the context of an immature immune system, resulting in more frequent and severe opportunistic infection and rapid progress of HIV infection to AIDS. There is a difficulty in early diagnosis of HIV in perinatally transmitted infection in children due to passive transfer of maternal antibodies upto the age of 18 months. In these children the definitive diagnosis of HIV infection in children can only be done by biologic tests [for example PCR(Polymerase Chain Reaction) or viral culture] and it is not widely available. A combination of CD4 percentage and HIV-1 viral load have proven to be the best predictors of future disease progression and mortality in both adults and children [4,5,6]. So there is a need for early suspicion, detection and appropriate management of the HIV positive cases.

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Hence this study was taken up to know the clinical features, stage at presentation with symptoms and signs and the corresponding CD4 count prior to HAART and also to study the correlation between CD4 count and clinical stage of HIV infection.

Material and methods

The present study is a cross-sectional, descriptive and record-based study. A total of 137 children (between 18 months and 15 yrs) with HIV positive were registered in the ART centre in December 2009 at Chigateri hospital, Davangere. This centre has all the referred pediatric cases from all villages Davangere of district, as it was only the ART centre in the district. Hence this constitutes all the pediatric cases in the district.

Data was collected regarding the general details of patient like age, sex, occupation, clinical stage at first time of presentation, corresponding CD4 count at the time of presentation. The diagnosis of HIV infection was done by 3 positive ELISA test and confirmed by western blot as per the WHO guidelines.

ELISA test was done using (UBI HIV ½ EIA, BEIJING, United Biomedical LTD, China; DETECT HIV, Biochem immuno systems INC., Canada; ABBOTT EIA PLUS, Abbott, USA). Western blot was done by (HIV Blot 2.2 Gene labs, Singapore, IMMUNOBLOT INNOLIA., Immunogenetics, Belgium). CD4 lymphocyte subset testing was done using a flow cytometer (Becton Dickinson Facscan, USA). Additional investigations like chest X-ray, lymphnode biopsy, CSF examination etc were done in clinically indicated cases.

Statistical analysis

Chi-Square test, spearman's correlation test using SPSS 11.0 version.

Results

In our study maximum of 60.6% of them were in the age group pf 5-9 years and 59.85% of them were male. Repeated lower respiratory tract infection was very common presentation (33.6%) at the time of diagnosis, followed by pulmonary tuberculosis (19.7%) as shown in (Table 2). Maximum of 97.1% of them were perinatally infected (Table 1).

Table 1. Mode of transmission of HIV in study subjects

Mode of transmission	Number	%
Perinatal infection	133	97.1
Heterosexual route	3	2.1
Blood transfusion	1	0.8
TOTAL	137	100

Table 2. Clinical profile and CD4 count at the time of presentation

Clinical features	No	%	CD4 range
Pneumonia	46	33.6	82-966
Pulmonary Tuberculosis	27	19.7	80-868
Papular pruritus	22	16	114-612
Malnutrition	20	14.6	82-597
Chronic diarrhoea	18	13.1	82-554
Ear discharge	18	13.1	119-554
Lymphadenopathy	13	9.5	33-1107
Hepatosplenomegaly	9	6.6	124-1293
Extrapulmonary Tuberculosis	7	5.1	57-285
Parotid enlargement	5	3.6	322-588
Oral thrush	3	2.2	269-311
Asymptomatic	22	16.2	400-3320

Maximum were in the stage of II and III at the time of diagnosis. (Table 3). The relation between the WHO staging of HIV and Cd4 count was found to be negatively correlated by spearman's co-efficient of -0.35 and -0.59 in children <5years and >5years respectively with p(<0.01),which is significant (Figure 1).

Table 3. Age adjusted CD4 count distribution in Stages of HIV infection

STAGE	CD4 count >200	CD4 count <200
I	1 (0.7%)	25 (18.24%)
II	5 (3.6%)	47 (34.3%)
III	12 (8.75%)	36 (26.27%)
IV	5 (3.64%)	6 (4.37%)
Total	23 (16.69)	114 (83.31)

P<0.003(significant)
For children <5yrs the cut off CD4 count is 500

Discussion

Though the present study showed that, the mode of acquisition and clinical manifestations of pediatric HIV/AIDS in India are not substantially different from other countries.

Transfusion associated HIV continues to occur in India despite regulations requiring screening of donors [7,8]. In the present study the common clinical manifestations of HIV infection are lower respiratory infections, hepatomegaly, generalized lymphadenopathy, splenomegaly, skin infections, similar to recent reports from India [2,3,9]. The present study is in accordance with other studies, showed that tuberculosis was the second most common opportunistic infection[2].

Failure to thrive was the most common presentation in the study done by Valsan Philip vergese et al [7] but there were only 14.6% of them with severe malnutrition in present study. Merchant RH noticed PEM in 44.56% of children had malnuitrition which could include all forms of malnutrition. Another study done in north Karnataka[10] the severe form of malnutrition was found in 56.33%. Hepatosplenomegaly were present only in 6% of cases, but they found in 70% of cases [7,11]. The earliest reports of AIDS in Indian children have come from multitransfused thalassemic children [12].

None of the studies, which I have reviewed, have done the correlation studies between CD_4 count and clinical staging of HIV. Since HIV progress fast in children due to immature immune system, there is a need to diagnose and find the HIV status of children with high degree of suspicion when child presents with repeated infection. CD_4 count may be considered for the staging purpose and considered for management even before the patient present with signs and symptoms, since it has a significant role for developing AIDS condition.

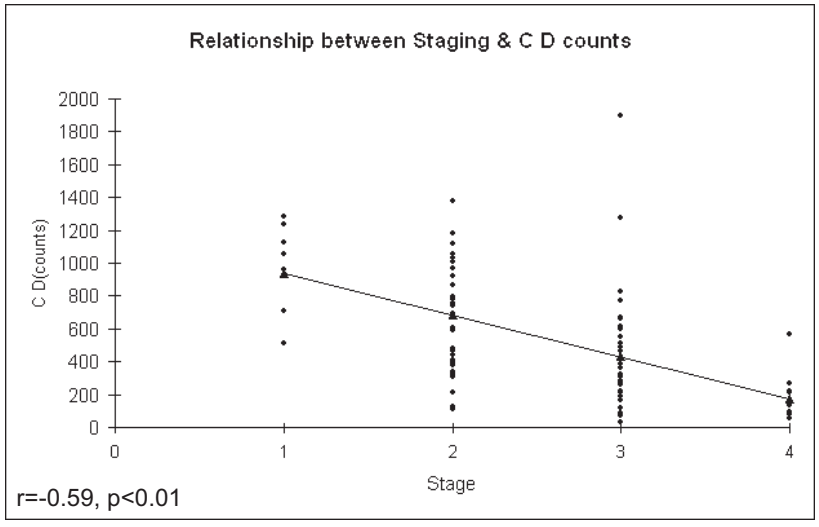

Figure 1. Relationship between staging and CD4 counts

This study mainly contributes to document natural history of HIV/AIDS in children prior to HAART, particularly in the developing countries, clinical presentation of paediatric HIV/AIDS appears similar with reports from other countries inspite of the wide variation in HIV-1 subtypes.

Developed countries have achieved success in reducing the vertical transmission by giving HAART to HIV positive mothers during their pregnancy and to the infant within a few hours of birth, by carrying out elective caesarean section and by providing safe alternatives to breast milk. But developing countries are unable to replicate this success because the majority of mothers do not have access for diagnosis to establish their HIV status, nor do they have access to antiretroviral therapy for themselves or their child. Elective caesarean sections are also rarely performed in developing countries, for practical reasons. Another reason is that even assuming that mothers know the risks, something basic like an alternative to breast milk can be unavailable, or even dangerous due to unsafe water in more remote locations.

Conclusion

CD4 count and WHO staging of HIV are considered separately for the management of HIV case, but it should be considered holistically to proceed with the case.

Perinatal transmission is the most common transmission. This high rate of vertical transmission of HIV reinforces the need for effective Prevention of mother to child transmission (PMTCT) intervention in reducing the incidence of HIV in children. A high index of suspicion and awareness of modes of presentation of HIV infection in children is needed for early diagnosis of those infected with HIV.

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