Indian Adolescent Living with HIV-AIDS: Current Clinical Scenario

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Abstract

Introduction: Statistics suggest that, HIV has now largely become the disease of young patients. Hence, the adolescent HIV/AIDS needs to be handled and managed separately from adult HIV. Relatively fewer Indian data exist to characterize the associations in adolescents and young adults infected with HIV disease. The present study explores the current challenges in the management of HIV infected adolescents.

Objectives: The study was aimed at evaluating, relationship between CD4 count and duration of antiretroviral therapy (ART), effects of ART on body mass index and the adverse effects of antiretroviral drugs in adolescent HIV positive patients.

Methods: This was a cross-sectional study involving 60 HIV positive adolescent patients attending tertiary care Institute KEM Hospital, Parel over duration of one year conducted at Mumbai. Patients on ART between age group 12 to 19 years. ART naïve patients were excluded from the study.

Results: 60 adolescent HIV positive patients attended our OPD including 37 males (61.67%) and 23 females (38.33%). The most common mode of transmission was vertical (80%). Education level was: school dropouts – 15%, primary education – 30%, Completed SSC – 31.7%, higher secondary – 23%. Among ADRs were 12 (63.15%) cases of anaemia due to Zidovudine, 4 (21.05%) hepatitis due to Nevirapine, 2 (10.52%) Tenofovir induced AKI and 1 (5.26%) Nevirapine rash. Wilcoxon matched pairs test showed a highly significant increase in the BMI (p <0.0001) post therapy. The mean CD4 of the patients at baseline and current presentation was 295.57 ± 109.81 and 630.93 ± 188.70 cells/mm³ respectively. The CD4 count was seen to be increasing with the increase in the duration of HAART treatment.

Conclusion: High efficacy of HAART and availability of free ART under government programme has increased the duration of survival of the adolescent population with HIV. Treatment with HAART showed a favourable response with a statistical significant increase in CD4 count. Longer the duration of HAART, higher was the gain in CD4 count. Indian adolescent receiving long term ART, Lipodystrophy is not a troubling issue. Indian adolescent seems to be more tolerance of ART than the other parts of world.

Editorial Viewpoint

• Adolescent HIV/AIDS needs to be managed separately.
• HAART and free ART have increased survival in adolescent with HIV/AIDS.
• Indian adolescents patients are more tolerant to ART than other parts of the world.

Introduction

Recent times have witnessed a transition in the prognosis of Human Immunodeficiency Virus (HIV) infection, from a fatal disease to a chronic manageable disease. Into the third decade of the HIV and Acquired Immunodeficiency Syndrome (AIDS) epidemic, there are 34 million people worldwide living with HIV, five million of whom are aged between 15 and 24 years. Adolescents have been described as the ‘fulcrum’ and the ‘centre of the epidemic’, with 42% of new HIV infections occurring in this age group in 2010. In India, although adolescent and youth ages (ages 15-29 years) account for almost 25 per cent of the country’s population, a substantial 31 per cent of these are affected with AIDS. This suggests that young people are at a high risk of contracting HIV infection. These statistics suggest that HIV, has now largely become, the disease of young patients. Hence, the adolescent HIV/AIDS, a separate epidemic, needs to be

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Received: 08.11.2016; Accepted: 01.06.2017
handled and managed separately from adult HIV. Adolescents have been categorized as a vulnerable group for HIV infection due to many reasons. Adolescents undergo a range of psychosocial developments while growing physically. Young people are more vulnerable to Sexual transmitted diseases (STIs) than adults. Physiologically, girls are more vulnerable to STIs than boys. Also, sex education, unsafe sexual practices, social norms, lack of information, exposure of young children to drug injections etc. contribute to this risk.3

It may be important to review the appropriateness of anti-retroviral therapy (ART) dosing in younger adolescents as children transition from paediatric doses into adult doses.4 Adequate options for pediatric appropriate antiretroviral drugs may also play a role in the outcomes in adolescents. Often choices are limited and formulations are inappropriate. Adequate adherence to medication may on the other hand, be an important factor in older adolescents and youth where all of the psychosocial factors may play a role in an individual’s ability or willingness to be adherent.5

Highly active anti-retroviral therapy (HAART) has changed the face of HIV/AIDS by causing a dramatic decrease in HIV-related morbidity and mortality.6 However, adverse events such as vomiting, anaemia; hepatitis, pancreatitis, peripheral neuropathy, lipoatrophy, lipodystrophy, and Steven Johnson Syndrome have been reported with the use of HAART.7,8 The prevalence of adverse events related to these drugs may rise with increased use of antiretroviral therapy.

Anti-retroviral treatment has also been associated with metabolic complications, alterations in body fat distribution and chronic kidney disease.9 Less data exist to study the associations in adolescents and young adults infected with HIV in early childhood. The study was aimed at evaluating, relationship between CD4 count and duration of antiretroviral therapy (ART), effects of ART on body mass index and the adverse effects of antiretroviral drugs in adolescent HIV positive patients.

Methods

Study design
This was a cross-sectional study involving 60 HIV positive adolescent patients on HAART attending OPD over duration of one year.

Setting / Source of data
KEM Hospital, Parel, Mumbai.

Methodology
Patients on HAART between age group 12 to 19 years were included in this study. 74 patients fulfilling inclusion criteria were screened for the study. 14 patients denied consent, hence sixty consecutive HIV positive adolescent patients attending tertiary care institute of metropolitan City of Mumbai who fulfilled the inclusion criteria were recruited over a period of one year. Institutional Ethics Committee (II) Seth G S Medical College and KEM Hospital granted permission for this study. Written informed consent of the patients or their legal guardians was obtained. Assent was taken as and when required. The detailed history of the patients, including the details of opportunistic infections, treatment history and adverse drug events, was recorded. Demographic details such as height and weight at the time of diagnosis, as obtained from patient’s case records, and the time of recruitment in the study were also recorded. Detailed clinical examination was performed by the clinicians who assessed for fat loss in the extremities, buttocks, face and accumulation of fat in the abdomen and dorsocervical spine. All data was recorded at one time and compared to data at the time of diagnosis available from previous records.

Statistical Analysis
Sample size was calculated using Raosoft formula. Descriptive statistics were used. Wilcoxon matched pairs test was used to compare parameters from baseline to post therapy.

Results
60 adolescent HIV positive patients were studied which included 37 males (61.67%) and 23 females (38.33%). The age range of these patients was between 12 to 19 years with a mean age of 16.73 years. The baseline height was 132.63 cm which showed a significant increase to 145.27 cm at the time of assessment. This increase in height is attributed to the accelerated growth phase during the adolescent period.

The patient characteristics like demographics, mode of transmission, parents survival status, level of education, clinical staging and opportunistic infection are summarised in Table 1. It was also noted that the significantly higher number of school dropouts had both parents deceased (Table 2). The correlation between school drop out with parents survival p=0.0011 using Fishers Exact test. This shows that schooling of HIV positive adolescents is affected if both the parents are deceased. The mean duration of ART in the patients included in the study was 3.7±1.66 years.

Common Opportunistic infections in the study patients infected with HIV is depicted in Table 1 and clinical staging of the study patients is depicted in Figure 1.

The adherence of the patients to the therapy was 93.23±12.8%. Common treatment regimens used were Zidovudine, Lamivudine and Nevirapine (ZLN) in 48%, Stavudine, Lamivudine and Nevirapine (SLN) in 25%, Tenofovir, Lamivudine and Nevirapine (TLN) in 13.33%, Zidovudine, Lamivudine and Efavirenz (ZLE) in 8.33%
Persistent generalized infections      Other skin infections      Oral candidiasis      Herpes zoster      Tuberculosis

Opportunistic infections

Stage 4

Stage 2

Stage 1

Clinical staging

Mode of transmission
- Vertical
- Blood transfusion
- Heterosexual
- Unknown

Parent’s survival status
- Single parent alive
- Both parents alive
- Both parents deceased
- Single parent deceased

Level of education
- Age appropriate
- Not age appropriate
- School dropout
- Schooling below SSC
- SSC
- HSC
- Above HSC and degree

CD4 Count

The mean CD4 of the patients at baseline and current presentation (Figure 4) was 295.57 ± 109.81 and 630.93 ± 188.70 cells/mm³ respectively. On comparing it was found that the mean current CD4 count was significantly higher as compared to that at baseline. *p<0.0001 Wilcoxon matched pairs test. The CD4 count was seen to be increasing with the increase in the duration of HAART treatment (Figure 5).

Discussion

Adolescents are a subset of the population between the age group of 12-19 years. However, many published studies carried out on HIV infected adolescent patients, have included patients over 19 years of age as adolescents in their studies.10-12 Hence, the data obtained from these studies may not represent the adolescent population exclusively.

In our study, the proportion of males was more than the females (61.67% and 38.33% respectively) as compared to males. However, in a study by Martinez J et al,16 the proportion of males was more i.e. 60%. Thus, the proportion of males and females in the adolescent group vary in different studies. Our study was conducted in a tertiary government health care setup in the metropolitan city of Mumbai, which is commonly accessed by people belonging to the lower socioeconomic status. To add to it, the social taboo associated with HIV negatively impacts the access of such facilities by women. This could possibly be the reason for higher percentage of males in our study.

Vertical transmission was found to be the most common mode of transmission of HIV, which was seen in 80% of the patients in our study, similar to other studies. However, vertical transmission was higher in our study compared to other studies, viz. Modi M et al15 (64%) and Harrison A et al17 (73.4%). Modi M et al study was conducted in 2001, during which period ART was not freely available. Availability of ART freely in recent years have led to prolonged survival of patients contracting HIV perinatally. Also, transmission through sexual route was seen in fewer patients (5%) in our study. This could be attributable to changing trends in the pattern of sexual behaviour in adolescents, which is possibly due to school health and sex education programmes resulting in increased awareness about HIV prevention. Blood transfusion was responsible for HIV infection in 10% patients in our study. Use of 4th generation HIV ELISA tests, which are more sensitive and specific for detection of HIV, may be responsible for better screening of donors and hence, lesser incidence in our study.

At the time of diagnosis, most of the patients were in Stage 1 (41.67%) and Stage 2 (23.33%), while few were in Stage 3 (20%) and Stage 4 (15%). At the last visit,
however, 95% patients were in Stage 1 and 5% were in Stage 4. Thus, early initiation of HAART therapy showed a decreased incidence of opportunistic infections.

53(88.33%) of patients had BMI less than 50 percentile at diagnosis. The BMI of the patients increased significantly at the last visit compared to the baseline. It was also noticed that the rise in BMI to normal was significant after starting HAART. This implies that ART has a positive influence on BMI indicating an improved health status of the patients. There have also been contradicting evidences from other studies suggesting that the increase in BMI is seen only in adults and not adolescents (Tremeschin MH et al)18 and also that there is no increase in BMI post-HAART therapy (Verweel G et al).19 These varied results highlight the possibility of increase in BMI only if the baseline BMI at the initiation of HAART is very low. In our study, the baseline BMI was less than 5 percentile in 40% boys and 35% girls below 17 years, which would likely confirm this hypothesis. Piloya T et al showed adolescents who had been switched to Zidovudine (AZT) based regimen but were previously exposed to Stavudine (d4T) for at least six months and children on d4T, 55% had abnormal fat redistribution.20 In our study there was no loss of fat from any part of the body during the follow up of the patients. Though 33% of the patients received Stavudine-based regimen, lipodystrophy was not found. Serum Cholesterol and Triglyceride levels were found normal on ART. Our study does not concur with study conducted by National Autonomous University of Mexico by María Rocío Muñoz and colleagues.21 They found 54% of patients (2-18 years) developed changes in metabolic parameters or redistribution of fat. The absence of lipodystrophy, hyperlipidaemia, redistribution of fat or presence of metabolic syndrome was not seen in Indian adolescents in spite of long durations of ART drugs may be because of poor baseline BMI. Also the patients from our resource poor lower socio economic group have limited access to refined food; our facility is government run tertiary care centre. Vigano A et al proved that replacing Stavudine with Tenofovir and protease inhibitor with Efavirenz for 96 weeks in lipoatrophic paediatrics patients led to a restoration of physiological fat accrual.22 We are not facing such challenges as of now.

The mean CD4 counts of patients in our study were 295.57 and 630.93 at the baseline and last visit, respectively. This highly significant rise in CD4 counts in patients on HAART highlights the efficacy of HAART in HIV infected
The present study shows significant beneficial effect of HAART in adolescents with HIV infection. High efficacy of HAART and availability of free treatment has increased the duration of survival of the adolescent population with HIV. This was evident from the fact that the presence of higher percentage of patients in the study, infected via vertical transmission as neonates, reached adolescence. Treatment with HAART showed a favourable response with a statistical significant increase in CD4 count. Longer the duration of HAART, higher was the gain in CD4 count seen. Among the Indian adolescent receiving long term ART, Lipodystrophy is not a troubling issue. Indian adolescent seems to be more tolerance of ART than the other parts of world. Increased awareness and decreased social taboo associated with HIV seem to be responsible for increased adherence to HAART.

Acknowledgements

The authors wish to acknowledge the contribution of Dr. Rajani Rokade, from Pharma Soulz, for assistance with manuscript preparation.


