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Mode of Transmission and Clinical Profile of HIV in Children, East Godavari District, A.p

Medical Science

KEYWORDS : HIV in children, vertical transmission, clinical profile

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ABSTRACT

The present study was taken up to evaluate the mode of transmission and clinical profile of HIV in children. It was a cross sectional observational study which included HIV seropositive children of less than 15 years age who presented to the pediatrics department with various clinical manifestations and also symptomatic children who accompanied the parents and siblings to ART centre and were found to be seropositive on screening. 442 HIV positive children were enrolled in the study. The mean age of presentation was 8.63±2.9 years. Vertical transmission was the probable mode of transmission in 97.7% children. Prolonged fever and cough more than 1 month were the commonest presenting clinical features. 79% of enrolled children were malnourished. Tuberculosis was the commonest opportunistic infection. Awareness of clinical spectrum of HIV helps in early screening and intervention.

INTRODUCTION

HIV/AIDS is one of the devastating pandemics affecting the mankind for the past three decades. In 2009, it was estimated that there were 2.39 million people living with HIV in India. Of these, women constitute 36 per cent while children comprised 4.4 per cent[1].

Bearing the impact of HIV/AIDS on mankind, the United Nations General Assembly renewed its commitment to 'accelerate progress towards the elimination of new child infections by 2015, reducing the number of new HIV infections among children by 90 percent by the year 2015 and reducing mother to child transmission of HIV (MTCT) to 5 per cent2. Millenium Development Goal 6 (MDG) refers to halting the spread and treatment of HIV/AIDS 3.

Vertical transmission is the predominant mode of transmission in pediatric HIV; accounting for 95 percent of the total cases. As evident from the Western experience, vertical transmission of HIV can be nearly eliminated with the help of timely intervention during pregnancy, labour, delivery and through breastfeeding. The aim of infant feeding practices in the context of HIV should not be mere prevention of HIV transmission but also ensuring the health and survival of infants – referred to as HIV-free survival4.

The clinical manifestations of HIV infection vary widely among infants, children, and adolescents. Initial symptoms may be subtle, such as lymphadenopathy and hepatosplenomegaly, or nonspecific, such as failure to thrive, chronic or recurrent diarrhea, respiratory symptoms, or oral thrush, and may be distinguishable only by their persistence. With this background the present study was taken up to evaluate the mode of transmission and clinical profile of HIV in children.

METHODOLOGY:

The present study was a cross sectional observational study conducted over a period of 18 months from December 2009 to March 2011 in the Department of pediatrics, Government General Hospital, Kakinada. The study population included HIV seropositive children of less than 15 years age who presented to the pediatrics department with various clinical manifestations and also asymptomatic children who accompanied the parents and siblings to ART centre and were found to be seropositive on routine screening.

A predesigned proforma was used to collect the details of children like age, sex, socioeconomic status, HIV status of family members, details of breast feeding, probable mode of transmission and presenting symptoms. A complete physical examination was done. Routine investigations like Hb%, TC, DC , ESR and CD4 count were done for all children. Chest X-ray , mantoux test , sputum/ gastric aspirate for AFB, FNAC , 2D ECHO and CT scan/ MRI brain etc. were done whenever required.

Clinical staging was done using the WHO clinical staging chart. Immunological staging was done based on CD4 percentage. IAP classification (wt for age) was used to grade the nutritional status. Diagnosis of pulmonary and extra pulmonary tuberculosis was based on clinical features, contact history, positive Mantoux test, FNAC and AFB positivity. *Pneumocystis jirovecii* pneumonia was diagnosed based on clinical presentation of progressive dyspnea, tachypnea disproportionate to X-ray findings , low oxygen saturations and chest X-ray features ranging from normal to ground glass opacity or diffuse nodular appearance. Children were referred for initiation of ART if eligible as per WHO and national guidelines. The collected data was tabulated and statistically analyzed using SPSS 17.0 VERSION.

OBSERVATION & RESULTS:

442 HIV positive children were enrolled in the present study. The age and gender distribution is given in table 1. The mean age of presentation was 8.63 ± 2.9 years. 75% children were above 7 years of age. 432 children acquired the infection by vertical transmission. Blood transfusion and unsafe injection practices were the probable modes of transmission in four and six children respectively. HIV status of family members is given in table 1. Siblings were also found to be affected in 85 cases that constituted 19.2 % of the total HIV positive children studied. Out of 432 children with seropositive mothers 45(10.4%) were not breast fed, 137 (31.7%) were given mixed feeding and 250 (57.8%) were exclusively breast fed for 4-6 months. Table 2 shows the presenting clinical features of HIV positive children. The commonest presenting feature was prolonged fever(45%), followed by cough more than one month (25%), loss of appetite (21%) and recurrent diarrhea(17%). 135 children (30.5%) were asymptomatic. They were found to be HIV positive on screening of siblings of HIV infected children or offspring of HIV infected adults. 99%of seropositive children were anemic. Prevalence of mild, moderate and severe anemia was 39.4% , 49.5% and 11% respectively. 79% children enrolled were malnourished. 35% were having severe

malnutrition (grade III & IV). 30.5%, 22%, 44% and 3% of HIV infected children were in WHO clinical stage I, II, III and IV respectively. Table 3 shows correlation between CD4% and clinical staging. The mean CD4% was 18.2 in children of clinical stage IV whereas the mean CD4 % was 28.4 in children of clinical stage I. This difference is statistically significant with p value of <0.001. The mean CD_4% was 21.2, 28.8 , 27.6 and 21.9 in children of <3 years , 4-5 years , 6-10 years and 11-15 years respectively.Table 4 shows correlation between opportunistic infections and mean CD_4%. Pulmonary Koch's was the commonest opportunistic infection (16 children) followed by oral candidiasis (9), *pneumocystis jirovecii* pneumonia (7), extra pulmonary tuberculosis (4) and herpes zoster (4).

DISCUSSION:

In the present study the mean age of presentation was 8.63±2.9 years. The mean age of presentation was 4.8 years , 26.9± 30.8 months, 5.75 years and 4 years in studies done by Agarwal et al[5], P N obiagwu et al[6], Ramesh et al[7] and Rakesh et al[8] respectively. 75% of the HIV positive children in the present study were above the age of 7 years where as in other studies majority of patients were less than 5 years age[9,10]. The mean survival time of vertically infected children ranges from 75-90 months and approximately 70% of them reach the age of 6 years[11]. Less than 5 % of perinatally infected children have normal CD counts and very low viral loads for longer than 8 years. The mechanism of delay in progression includes effective immune responses, host genetic factors or infection with attenuated virus. The mean age of presentation of 8.6 years in the present study shows that these children are slow progressors.

In the present study vertical transmission was the probable mode of transmission in 97.7% of HIV positive children. The percentage of HIV positive children with vertical transmission varied from 64 to 94% in several studies[6,7,8,9,12]. In the present study 19.2 % of HIV positive children had one sibling who is also seropositive. History in most of the cases revealed that the mothers were not aware of their status during first pregnancy. S.Rajasekharan et al[10] from Chennai reported sibling positivity in 10% of children. This indicates inadequacies in PPTCT services. The rate of transmission from HIV positive mother to their children varies from 12 to 30%. Perinatal treatment of HIV infected mothers dramatically reduced the rate of vertical transmission to < 2% in developed countries. In April 2012, in response to Malawi's early success and other strategic and technical developments, WHO released an important update on the "use of antiretroviral drugs for treating a pregnant woman and preventing HIV infection in infants" which states that "option B and specifically B^+ seem to offer important programmatic operational advantage and thus could accelerate progress towards eliminating new pediatric infections"[13].

In the present study 250 (57.8%) children of seropositive mothers were exclusively breastfeed for 4 to 6 months and 137 (31.7%) children were given mixed feeding. It is believed that mixed feeding carries a 70% greater risk of MTCT because the other liquids given along with breast milk can damage the already delicate and permeable gut wall of the small infant and allow the virus to be transmitted more easily. Infant feeding in the context of HIV is complex. The dilemma is to balance the risk of infants acquiring HIV through breast milk with the higher risk of death from causes other than HIV, in particular malnutrition and diarrhea among non-breast fed infants. The 2010 UNICEF guidelines recommended that the national authorities in each country should decide which infant feeding practice and interventions i.e. Breastfeeding with an ARV intervention or avoidance of all breastfeeding should be promoted and supported as a single national public health recommendation by their maternal and child health services. The recommendation that replacement feeding should not be used unless it is acceptable, feasible, affordable, sustained and safe (AFASS) remains, but the acronym is replaced by more common everyday language and terms as the concept of AFASS had proven difficult to translate into practical counseling message[4].

In the present study blood transfusions and unsafe injections practices were the probable modes of transmission in 4 and 6 children respectively. This shows that stringent measures are to be taken prior to blood transfusion especially in private settings. Screening blood products cannot completely eliminate the risk of HIV transmission as the donor may be in 'window period'. So the usage of blood products must be restricted to dire emergencies. Wide spread awareness to be created regarding safe injection practices.

In the present study common presenting clinical features were prolonged fever, persistent cough and diarrhea. 79 % of HIV positive children were malnourished and 35% of them were severely malnourished. Similar clinical features were reported in other studies[6,7,8]. Pulmonary and extra pulmonary tuberculosis was the commonest opportunistic infection noted in children with HIV (5%) in the present study. Tuberculosis should be regarded as a sentinel illness for HIV infection and all children with tuberculosis must be screened for HIV and vice versa.

One of the distinctive clinical features in the present study was painless parotid enlargement (2%). Parotid enlargement in HIV is due to lymphocytic infiltration of the gland and it occurs at a stage of HIV infection when the immunity is still intact.

Most of the presenting features of HIV are nonspecific and indistinguishable from common childhood illnesses. The above findings suggest that all children with prolonged fever, persistent cough, severe PEM, tuberculosis and painless parotid swelling must be screened for HIV but clinical suspicion based screening even though important defects mainly the advanced cases.

In the present study the mean CD_4 count was less in children below 3 years of age (21%) and in children above 10 years age (21.9%) when compared to children between 4-9 years (28%). This is probably as a result of an immature response to HIV in young children and due to disease progression and deterioration of immunity in older children. Correlation of CD_4% with clinical staging showed decrease in CD_4% as the clinical stage progressed. Agarwal et al[5] reported similar results. CD_4% is reliable marker of clinical deterioration and can be used as a marker for early initiation of ART. The incidence of opportunistic infections was high in children with low mean CD_4 %. So improvement in CD_4 % by ART can decrease the incidence of opportunistic infections.

99% of seropositive children in the present study were anemic. 61% had moderate and severe anemia. Anemia in HIV is multifactorial. Chronic HIV infection causes marrow suppression. Micronutrient deficiency also contributes to anemia. So, micronutrient supplementation to all HIV positive children can reduce the incidence and severity of anemia.

STRENGTHS OF THE STUDY:

1. A family oriented approach to screen the children of seropositive parents and siblings of seropositive children helped in early identification of HIV in 30% of asymptomatic children.
2. The sample size is large and CD_4 counts were done in all children and eligible children were referred for initiation of ART.

LIMITATIONS:

As the study was a cross sectional study, the long term outcome of children and impact of ART on the disease progression cannot be studied.

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CONCLUSIONS:

As it is observed in developed countries strengthening of PPTCT services can reduce the prevalence of pediatric HIV. High index of suspicion and awareness of clinical spectrum of HIV help in early screening and intervention with ART which can arrest the disease progression. Proper counseling of all seropositive mothers regarding infant feeding options and risks of mixed feeding helps them in decision making. Nutrition interventions in HIV infected children may have significant impact on their disease progression.

TABLE 1: Demographic characteristics of HIV positive children

	NO OF CHILDREN	PERCENTAGE
SEX: MALE	215	48.6
FEMALE	227	51.3
AGE: 1-3 YEARS	16	3.6
4-6 YEARS	94	21.3
7-9 YEARS	134	30.3
10-12 YEARS	147	33.3
13-15 YEARS	51	11.5
HIV STATUS OF FAMILY MEMBERS:		
MOTHER +ve FATHER +ve	431	97.5
MOTHER +ve FATHER –ve	1	0.2
MOTHER –ve FATHER +ve	2	0.45
Mother –ve Father -ve Siblings +ve	8	1.8
	85	19.2
PROBABLE MODES OF TRANSMISSION :		
VERTICAL	432	97.7
BLOOD TRANSFUSION	6	1.35
UNSAFE INJECTION PRACTICES	4	0.9
FEEDING :		
EXCLUSIVE BREAST FEEDING	250	57.8
MIXED FEEDING	137	31.7
NOT BREAST FED	45	10.4
NUTRITIONAL STATUS :		
NORMAL	94	21.2
GRADE I PEM	89	20
GRADE II PEM	106	24
GRADE III PEM	97	22
GRADE IV PEM	56	12.6
ANEMIA :		
MILD	172	39
MODERATE	216	49
SEVERE	48	11

TABLE 2:
PRESENTING CLINICAL FEATURES

	NO OF CHILDREN	PERCENTAGE
FEVER > 1 MONTH	198	45
COUGH > 1 MONTH	110	25
LOSS OF APETITE	92	21
PERSISTENT / ACUTE DIARRHEA	75	17
SKIN MANIFESTTIONS	75	17
ABDOMONAL DISTENSION	22	5
EAR DISCHARGE	22	5
GENERALISED LYMOHADENOPATHY	22	5
PAROTID SWELLING	10	2
SEIZURES	5	1
ASYMPTOMATIC	135	30

TABLE 3:
CORELATION OF MEAN CD_4% WITH CLINICAL STAGING

WHO CLINICAL STAGING	MEAN CD_4 %	SD	IMMUNOLOGIC CATEGORY			
			NOT SIGNIFICANT	MILD	ADVANCED	SEVERE
I	28.4	7.1	113	11	5	6
II	24.7	7.61	63	12	13	10
III	24.7	9.11	117	23	24	30
IV	18.2	10.51	6	1	3	5

TABLE 4 :
Opportunistic infections vs CD_4%

OPPORTUNISTIC INFECTIONS	NO OF CHILDREN	MEAN CD_4 %
PULMONARY KOCH'S	16	9.6
CANDIDIASIS	9	8.7
PNEUMOCYSTIS	7	11.2
EXTRA PULMONARY KOCH'S	4	20.2
HERPES ZOSTER	4	4.8

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