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Skin Manifestations in HIV Positive Children

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Abstract
HIV infection in children is quite common in our country. Skin manifestations constitute one of the most common clinical features in such children and their clinical pattern and severity is more or less in accordance with their CD4 counts. Indian data for Paediatric HIV is scarcely available. In our study of 102 population, most manifestations are of infective in etiology in origin(64.70%).In the infective etiology, most are VIRAL in origin 29 (28.43%). Next common is pruritic popular eruptions (PPE) 17 (16.66%) which is inflammatory in nature and is of non –infective in origin. Next common is SCABIES 14 (13.72%) which is parasitic infection in nature. Bacterial origin are 12(11.76%), Fungal origin are 11(10.78%.14 children had allergic reactions with 13.72%

Keywords: *Skin manifestations, HIV, infections.*

Introduction

Human immunodeficiency virus (HIV) infection in children is becoming a common occurrence. In children, it is largely a preventable disease. Skin manifestations constitute one of the most common clinical features in such children and their clinical pattern and severity is more or less in accordance with their CD4 counts. Thus an early recognition of such features is important for an early diagnosis and also to assess the prognosis of HIV infection. Children with HIV infection are more prone to adverse cutaneous drug reactions, both to anti-retroviral therapy (ART) and to other drugs that are given concomitantly for comorbid illnesses. The first pediatric case of AIDS was reported to the Centre for Disease Control and Prevention (CDC) in November 1982. Globally, there were a total of 33.2 million people living with HIV, in 2007, of which 2.5 million (7.5%) were children under the age of 15 years[1]. Total number of deaths was 2.1 million, of which 330,000 were children. It is estimated that more than 90% of children living with HIV acquired the virus during pregnancy, birth, or breastfeeding, forms of HIV transmission that can be prevented[2].

In 2007, it is estimated that there are 2.31 million (1.8-2.9 million) people living with HIV/AIDS in India (making it the third largest country with regard to the number of people with HIV) with an estimated adult HIV prevalence of 0.34% (0.25-

0.43%). Out of the estimated number of PLHA (people living with HIV/ AIDS), 39% are females and 3.5% are children[3].

Skin is commonly involved in HIV infection and nearly 90% of patients with HIV infection have dermatological manifestations at some stage during the course of their disease[4,5].

The data currently with regard to the mucocutaneous manifestations of HIV infection in pediatric population come mainly from the western literature. The prevalence of mucocutaneous manifestations in children with HIV infection, from various parts of the world, is highly variable, ranging from as low as 42% to almost 93%.[6,8-12]. In India, skin manifestations among HIV-infected children show a prevalence rate varying from 30 to 80%[7,13,14]. HIV-infected children often present with common childhood infections. These, however, tend to be more severe, may manifest atypically, are often resistant to treatment, and tend to have a high rate of recurrence.

Aims and Objectives of the study

Primary Objective

To study the spectrum of mucocutaneous manifestations of HIV infection in children.

Secondary Objective

To correlate mucocutaneous manifestations of HIV infection with the degree of immunosuppression in children.

Methods and Materials

Present study was cross sectional type carried out in tertiary care center in western Maharashtra from Jan 2016 to March 2017. Approval from institutional ethics committee has been taken.

Study design: It is a cross sectional study

Inclusion Criteria

All pediatric patient (<12 years) having following features was included in study

- Documented Laboratory diagnosis of HIV infection (by a positive DNA PCR in those < 18 months and a positive ELISA test in those > 18 months).
- Guardian of patient who has been given written informed consent.

Exclusion Criteria

- HIV positive pediatric patient without skin manifestations or disease

Source of Data

All children (<12 year) diagnosed with HIV with skin manifestations in

- Dermatology wards
- Pediatric wards
- Dermatology OPD
- Pediatric OPD
- Any other medical ward

Study Population and Sample Size

All pediatric patients with above mentioned inclusion and exclusion criteria came to pediatric and dermatologic wards and outpatient department in given study period was included in study. So from Jan 2016 to March 2017 we got 102 patients with given inclusion criteria and all these patient were included in the study.

Method of Collection of Data

A complete one-time dermatologic examination of the skin, mucosae, hair and nail will be performed. The diagnosis of cutaneous disorders will be made clinically and confirmed by appropriate laboratory investigations where indicated (scrapings, cultures, biopsies, serology, etc.). Apart from this data about gender, age, mode of transmission of HIV from parent to child, time of onset of skin manifestations etc. obtained from patient with help of pretested structured questionnaire. Blood investigation was performed for calculation of CD 4 count to assess grading of immunosuppression.

Results were calculated in percentage. Chi square test is applied wherever required. Epi Info 7.2 software was used for statistical analysis.

Results

Table no.1: Age Distribution

Age group	Male	Female	TOTAL	Percentage
0 to 3 yrs	3	2	5	4.90%
4 to 5 yrs	2	7	9	8.82%
6 to 12 yrs	53	35	88	86.27%
TOTAL	58	44	102	100%

Our study of 102 pediatric HIV populations with skin manifestation show peak incidence between 6 to 12 years with 86.27 %. Only 4.90% of total patients present in 0 to 3 yrs, youngest being 2 yrs of old. Out of 102 children 58(56.86%) are males, and remaining are females 44(43.13%)

Table no 2: Individual skin manifestation with gender distribution

Skin manifestation	Male	Female	TOTAL	Percentage
Bacterial	8	4	12	11.76%
Fungal	4	7	11	10.78%
PPE	12	5	17	16.66%
Others	9	5	14	13.72%
Scabies	10	4	14	13.72%
Viral	14	15	29	28.43%
Xerosis	1	4	5	4.90%
Total	58	44	102	100%

In our study of 102 population most manifestation are of infective in etiology in origin (64.70%) in that infective etiology , most are VIRAL in origin 29 (28.43%) Next common is pruritic popular eruptions (PPE) 17(16.66%) which is inflammatory in nature which is of non-infective in origin. Next common is SCABIES 14 (13.72%) which is parasitic infection in nature .Bacterial origin are 12 (11.76%), Fungal origin are 11 (10.78%). 14 children are having allergic reactions with 13.72 %

Table no 3: Etiological distribution

Etiology	Male	Female	Total	Percentage
Infective	36	30	66	64.70%
Non infective	22	14	36	35.29%
Total	58	44	102	100%

Out of 102 pediatric HIV population majority are having skin manifestation of infective in etiology in origin 66(64.70%). Non infective are 36 (35.29%). out of 66 children with infective etiology 29 children are having viral skin manifestations 43.93%. of total infective etiology .Next are 14 children are having Scabies with 21.21% of total infective etiology.12 children are having bacterial skin manifestation with 18.18% of total infective etiology. 11 children are having fungal skin manifestation with 16.66% of total infective etiology.

36 children are having skin manifestation of non infectious etiology of which 17 children are having PPE with 47.22% of total non infective etiology.

Table no 4: Relation of skin manifestation and their mean CD4 count

Bacterial	Obs	Total	Mean	Variable	SD
cd4	12	9190	765.8333	59714.52	244.3655
Fungal	Obs	Total	Mean	Variable	SD
cd4	11	5052	459.2727	101099.6	317.9617
Others	Obs	Total	Mean	Variable	SD
cd4	19	13211	695.3158	100264.9	316.6463
PPE	Obs	Total	Mean	Variable	SD
cd4	17	10224	601.4118	84863.26	291.313
Scabies	Obs	Total	Mean	Variable	SD
cd4	14	9162	654.4286	42167.03	205.3461
Viral	Obs	Total	Mean	Variable	SD
cd4	29	14437	497.8276	25790.86	160.5953
	Obs	Total	Mean	Variable	SD
cd4	102	61276	600.7451	70944.67	266.3544

Table no 5: Relation of skin diseases with cd4 count and their significance

Skin manifestation	0 to 199	200 to 499	500 and above	TOTAL	p value
Bacterial	0	1	11	**12**	0.02
Fungal	1	8	2	**11**	0.006
Others	0	5	14	**19**	0.2
PPE	2	5	10	**17**	0.92
Scabies	0	3	11	**14**	0.15
Viral	0	18	11	**29**	0.01
TOTAL	**3**	**40**	**59**	**102**	

Out of 12 children with bacterial infection 11 patients are having CD4 count more than 500 and one patient is having CD 4 count 200 to 499 group , mean CD 4 count of bacterial diseases is 765.83 with standard deviation 244.36 with p value 0.02 which is significant which implies that bacterial diseases are associated with CD4 count more than 500 .

Out of 11 children with fungal infection 8 children are having CD4 count 200 to 499. 2 patients are having CD4 count more than 500 .Mean CD4 count for fungal infection is 459.2727 with standard deviation 317.9617 with P value 0.006 which is significant, which implies that fungal infection are more common in children with CD4 count less than 500.

Out of 29 children with viral infection 18 children are having CD4 count less than 500. 11 children are having CD4 count more than 500 Mean CD4 count for viral skin diseases is 497.82 with standard deviation 160.59 with P value 0.01 which is significant which implies that viral skin infections are more in children with CD4 count less than 500 .

Out of 17 patients with PPE 10 patients are having CD4 count more than 500. 5 children are having CD4 count from 200 to 499. Mean CD4 count for PPE is 601.41 with standard deviation 291.31 wit P value 0.92 which is not significant which implies that PPE does not show any statistically significant association .

Out of 14 patients with scabies 11 children are having CD 4 count more than 500 .Mean CD4 count for scabies is 654.42 with standard deviation 205.34 with P value 0.15 which is not significant which implies that there is no statistical association

Discussion

Cutaneous manifestations in HIV infected children in this study are mostly inflammatory and infectious in nature. They are widely spread, and respond less to conventional therapy. The increased incidence of skin infections is attributed to the depletion of the Langerhans's cells responsible for the mucocutaneous immunological system[68]. The distortion of the cutaneous immune system is also responsible for the emergence of a variety of non-infectious inflammatory dermatoses frequently encountered among HIV/aids individuals like PPE.

Age and sex incidence

Table no: 6 comparing peak age of incidence among various studies

Study	peak age	Male	Female
Millembe F Panya	6-10 yrs(45%)	180(52%)	167(48%)
Okechukwu	5 -6 yrs	44(47.3%)	49(52.7%)
Kondreddy	6-12 yrs(72.11%)	68(65.3%)	36(34.6%)
Present study	6-12yrs (86.27%)	53(60.22%)	35(39.77%)

In Our study of 102 pediatric HIV patients with skin manifestations, peak incidence is in 6 to 12 years age group with 86.27 % which in comparison with Kondreddy et al[101] and Millembe F Panya et al[62].Out of 102 children 58 (56.86%) are males, and rest are females 44(43. 13%).Other studies have reported different prevalence levels[63,74] indicating a wide regional variation. According to Luminous LM et al, children less than five years of age, are the less affected than the older ones[100]

Table no 7: comparison of infectious and non-infectious disease among various studies

Study	Infectious diseases	Non infectious diseases
Vaniaolivera de Carvalho	72.5%	27.5%
Millembe F Panya	57.54%	42.46%
Okechukwu	58.06%	41.93%
Present study	64.70%	35.29%

Infections are the most frequent cause of mucocutaneous disorders among HIV infected children[4,6,] which has also been shown in this study. The authors who carried out similar longitudinal surveys also observed the higher frequency of infectious diseases, which varied from 52.4% 4 to 73%.[4,]. In adults, Spira and Rosatelli found a higher number of patients with infectious skin diseases. The highest number of infectious dermatoses results most likely from the alteration of skin barrier functions resulting from the disease; Stingl[96] cites the reduction of Langerhans cells responsible for presenting antigens that reach the skin through the immunological system. According to Smith,[97] the increase in colonization by staphylococcus would be responsible for the higher number of infections in patients with reduced CD4 T-lymphocytes.

Table no 8: Level of immunosuppression and skin manifestations

Study	No Immunosuppression	Moderate Immunosuppression	Severe Immunosuppression
Millembe FPanya	104(30%)	129(37%)	114(33%)
Okechukwu	5(5.4%)	34(36.5%)	54(58.1%)
Wanankulal[9]	20%	43%	62%
Ranganathan K	33(26%)	74(58%)	20(15%)
Present study	53(51.96%)	40(39.21%)	9(8.82%)

Most of children in present study are fall into category of no immunosuppression with 53 (51.96%). and next are fall into category of moderate immunosuppression with 40(39.21%) which is in comparable with other studies like Millembe F Panya 129(37%), Okechukwu 34 (36.5%), Wanankulal[9] (43%). Only 9 patients are in category of severe immunosuppression. The present study show similarity with study byRanganathan K[65] where only 20(15%) are in severe immunocompromised group. This is because majority of children in present study are on regular HAART. There is strict adherence and strict follow up of patients regarding HAART therapy. Because these children does not become severe immunocompromised. so most children in present study are mild to moderate but not severe immunocompromised.

Table no 9: comparison of PPE among various studies

Study	PPE(%)
Vaniaolivera de Carvalho	32.5%
Millembe F Panya	45.5%
Okechukwu	30.1%
Kondreddy	4.8%
Umoru, D	20.7%
Present study	16.66%

In present study children with PPE are 16.66%, and it is comparable with the study by Umoru, D where it was 20.7%. In a study by Vaniaolivera de Carvalhoit was observed that PPE was 32.5%. In a study by Millembe F Panyait was observed that PPE was 45.5%. In a study by Okechukwuit was observed that PPE was 30.1%. In a study by Kondreddyit was observed that PPE was 4.8%. It was also described as the commonest skin manifestation in HIV infected adults and children in Haiti, most African and Asian countries by Mysowski et al[55];Martinez-Rojano et al.; Goh et al.PPE runs a chronic course and does not respond to either antihistamine or steroids, but most improves on starting highly active antiretroviral drugs (HAART).

Table no 10: Incidence of bacterial infection among various studies

Study	Bacterial
Vaniaolivera de Carvalho	25%
Wananukul et al[9]	7%
Safi Eldein EI	13.3%
Millembe F Panya	20%
Lim W et al[8]	8%
Okechukwu	12.9%
Kondreddy	10.5%
Present Study	11.76%

The incidence of bacterial infection is 11.76% in present study, which is in similar with other studies like Safi Eldein EI, Okechukwu, Kondreddy by Wananukul et al[9], Lim W et al[8]. The incidence of bacterial infection was 25% in a study by Vaniaolivera de Carvalho, 20% by Millembe F Panya which is differ with present study. Bacterial infection in form of impetigo/boil was seen in 12.9% of HIV-infected patients. S. aureus was the predominate organism isolated from them (impetigo/boils and furuncles); p. aeruginosa was isolated from one patient. Folliculitis was the commonest (63.6%), followed by impetigo (27.2%) and ecthyma (9%) among total bacterial infection. In present study impetigo (33.3%), acne (33.3%) followed by furunculous (16.6%). The mean CD4 count for bacterial infection was 398.55 in a study by Kondreddy. The mean CD4 count for bacterial infection 765.8 with P value 0.002 which is statistically significant which implies that bacterial infections are associated with CD4 count more than 500 .

Seborrheic dermatitis is another common (8.6%) inflammatory chronic papulosquamous disorder found in HIV-infected children in study by Okechukwu. Seborrheic dermatitis is one of the most cutaneous manifestations in adult HIV patients by Mysowski et al, Ray et al, Reymanud-Mendel et al. But in present study only one patient has Seborrheic dermatitis.

Xeroderma or acquired ichthyosis, which is frequent in diverse studies on skin diseases in Aids[4,] occurred in 67.5% of the patients surveyed in study by Vaniaolivera de Carvalho[57]. It was identically distributed in clinical-immunological

and viral load categories. Smith[97] found xeroderma in 75% of the 912 adult patients observed in the longitudinal studies and did not show a relation with the degree of immunosuppression. Incidence of xerosis in present study is 4.90% which shows similar relation with a study Lim W et al [8] where it was 8% and it does not show any statistical association with immunosuppression.

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