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# Dermatological Manifestations in HIV Paediatric Patients and their Relation to Clinico-Immunological Categories in A Tertiary Care Centre

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***Abstract***
***Background****: Dermatological manifestations are very common in HIV-related opportunistic events and are usually initial markers of immunodeficiency.*
***Objective****: To study the various dermatological manifestations in children with HIV in our institute and to correlate with clinical staging (WHO) and CD4 T-cell count.*
***Material & Methods****: This was a hospital based study where HIV positive children were studied for dermatological manifestations over a period of 1 year. Clinical profile and CD4 counts with other lab investigations were performed to derive any correlation. Statistical analysis was done with SPSS software where p value <0.05 was considered significant.*
***Results****: Out of 100 children included in this study fifty five were females and forty five males. The predominant mode of transmission of disease was Perinatal transmission (92%). On ART 60.29% subjects and 28.12% subjects not on ART had dermatological manifestations.Non infective lesions when considered as a single entity were also significantly higher when taking ART, which is statistically significant (p value 0.040). Forty percent subjects among HIV stage-I, 48% subjects among stage-II, 100% subjects among stage-III and 50% subjects among stage-IV had dermatological manifestations.The prevalence of Infective lesions in total 18% (p< 0.001), HZ 3%(p< 0.001) and in non infectious lesions toatal 51%, apthous ulcers11%(p< 0.001) was significantly higher when Immunosuppression was severe.Among non-infectious lesions (51%,)papulopruritic lesion,xerosis was the most common followed by aphthous ulceration. Among infectious lesions, scabies was the commonest, followed by candidiasis and molluscum.*
***Keywords:*** *dermatological manifestations, paediatric patients, CD4 count*

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## I. Introduction

Human Immunodeficiency Virus (HIV) is the infecting virus that threatens to engulf the entire earth, sparing no human being – man, woman or child. HIV/AIDS has become a pandemic.HIV infection in children progresses more rapidly than in adults. The World Health Organization (WHO) estimates that 2.2 million children less than 15 years of age were living with HIV infection at the end of 2004[1]. Children represent 5% of all people infected with HIV/AIDS. The first infant with HIV in India was identified in October 1986[2]. India has third largest population of patients with HIV/AIDS. HIV is transmitted by sexual contact, perinatally, administration of infected blood or blood products and contaminated injections[3]. HIV is classified based on WHO clinical staging system[4] and CDC classification[5] criteria.

Skin is one of the most frequently involved organs in HIV infection, and mucocutaneous manifestations may be one of the earliest markers of AIDS, it may also act as a prognostic marker of HIV infection,they include[6]:

- Herpes viridae,Molluscumcontagiosum,Superficial fungal infections
- Deep fungal infections, Bacterial infections,Scabies,Papulosquamous dermatoses, xerosis, seborrheic dermatitis, acquired icthyosis,Pruritic papular dermatoses
- Hair and nail disorders ,Severe aphthous stomatitis,Cutaneous vasculitis
- Neoplastic,Candida infection.

The Aim of this study is to determine the prevalence of dermatological manifestations, its varied presentations in HIV Children and its relationship to clinical criteria established by World Health Organisation and immunological criteria in according with CD4 T-lymphocyte values, CD4 percentage.

## II. Materials And Methods

This is a hospital based correlation study.The study was conducted at Niloufer hospital,Osmania Medical College,Hyderabad.Duration of the study period was from September 2015 to August 2016. Hundred children with diagnosed HIV were enrolled in the study. Subjects were enrolled from ART centre(Centre of Excellence) attached to Niloufer hospital and children attending OUT PATIENT Department at NILOUFER HOSPITAL for medical reasons and growth follow up. Children aged between 18 months – 18 years were included in the study. Suspected cases were tested by Coomb Aid test and those found positive were confirmed with TRIDOT and HIV EIA COOMB TEST which were then included in the study.

A predesigned proforma was used to collect information. This study has got the approval from the institutional ethical committee of Osmania Medical College. Informed Consent was obtained from parents/guardians for enrolment in the study. A detailed history including HIV status of the parents and siblings,mode of transmission, general and systemic clinical presentations were noted in the proforma. A thorough clinical examination was carried out for nutritional status, presence of opportunistic infections, skin manifestations etc. Blood investigations, radiological examinations and other relevant procedures were carried out for patients included in the study as per the requirement.The children enrolled were examined in detail, in the natural light from head to toe. Children on anti-retroviral therapy, details of ART – regimen and duration wereobtained.

Descriptive statistical analysis has been carried out in the present study. The Statistical software namely SAS 9.2, SPSS 15.0, Stata 10.1, MedCalc 9.0.1,Systat 12.0 and R environment ver.2.11.1 were used for the analysis of the data and Microsoft word and Excel have been used to generate graphs and tables.

## III. Results & Observations

The study group consisted of 100 children from 18 months to 18 years, of whom, majority were between 5 to 15 years. The modal age group was 5 to 10 years (47%). Forty five male children and fifty five female children were there. Sixty eight (68%) children were completely immunized. The most common mode of transmission was perinatal (vertical), unknown and blood products with percentages 92, 7, 1 respectively. Most of the children were diagnosed in stage 1 (60%) and other stages were 25%, 13% and 4% respectively. Sixty six (66%) subjects were on 1$^{st}$ line ART treatment, 2% on 2$^{nd}$ line treatment and 32% on no treatment. Forty two (42%) of the subjects were underweight and 18% were found stunted for their age and gender.Prevalence of anemia in the study subjects was 45%. It ranged from 25% in >15 years group to 47% in 5 to 15 years age groups. The CD4 counts ranged from 15 to 1461 cells per cu.mm, with a mean of 686.95. Most patients were in the 501 to 1000 range group. In 2/3rds of the patients, there was no evidence of immunosuppression.

Table 1 depicts prevalence of dermatological lesions (considered as single entity) according to WHO criteria. Maximum children did not have any skin lesions. Herper zoster, candidiasis, scabies, infective lesions, aphthous ulcer was higher in stage III and the difference of prevalence was found statistically significant.

**Table – 1:** Prevalence of dermatological lesions among the Stages of HIV:

| Lesion | Stage of HIV | | | | Total N=100 | p value |
|---|---|---|---|---|---|---|
| | I N=60 | II N=25 | III N=13 | IV N=2 | | |
| Molluscum | 2 | 1 | 0 | 0 | 3 | 0.903 |
| | 3.3% | 4.0% | 0.0% | 0.0% | 3.0% | |
| Herpes Zoster | 1 | 0 | 2 | 0 | 3 | 0.045* |
| | 1.7% | 0.0% | 15.4% | 0.0% | 3.0% | |
| Pyoderma | 2 | 0 | 1 | 0 | 3 | 0.606 |
| | 3.3% | 0.0% | 7.7% | 0.0% | 3.0% | |
| Candidiasis | 0 | 0 | 4 | 0 | 4 | 0.000* |
| | 0.0% | 0.0% | 30.8% | 0.0% | 4.0% | |
| Scabies | 1 | 1 | 2 | 1 | 5 | 0.005* |
| | 1.7% | 4.0% | 15.4% | 50.0% | 5.0% | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Infective Lesions** | **6** | **2** | **9** | **1** | **18** | **0.000*** |
| | **10.0%** | **8.0%** | **69.2%** | **50.0%** | **18.0%** | |
| Xerosis | 9 | 4 | 4 | 0 | 17 | 0.504 |
| | 15.0% | 16.0% | 30.8% | 0.0% | 17.0% | |
| Hyperpigmentation | 3 | 0 | 1 | 0 | 4 | 0.627 |
| | 5.0% | 0.0% | 7.7% | 0.0% | 4.0% | |
| Lichenoid | 1 | 0 | 0 | 0 | 1 | 0.879 |
| | 1.7% | 0.0% | 0.0% | 0.0% | 1.0% | |
| Aphthous ulcer | 4 | 2 | 6 | 0 | 12 | 0.001* |
| | 6.7% | 8.0% | 46.2% | 0.0% | 12.0% | |
| Papulopruritic | 8 | 6 | 3 | 0 | 17 | 0.534 |
| | 13.3% | 24.0% | 23.1% | 0.0% | 17.0% | |
| **Non infective** | **25** | **12** | **14** | **0** | **51** | 0.121 |
| | **41.7%** | **48.0%** | **107.7%** | **0.0%** | **51.0%** | |
| No Lesion | 36 | 13 | 0 | 1 | 50 | 0.001* |
| | 60.0% | 52.0% | 0.0% | 50.0% | 50.00% | |

The prevalence of Xerosis was significantly higher when taking ART. Non infective lesions when considered as a single entity were also significantly higher on ART.

**Table – 2**: Prevalence of Dermatological Lesions in relation to CD4 count among study subjects below 5yrs of age

| **Lesion** | **CD4 Count** | | | **Total N=9** | **p value** |
|---|---|---|---|---|---|
| | **<500 N=0** | **501 – 1000 N=7** | **>1000 N=2** | | |
| Molluscum | 0 | 0 | 0 | 0 | -- |
| | 0.00% | 0.0% | 0.0% | 0.0% | |
| Herpes Zoster | 0 | 0 | 0 | 0 | -- |
| | 0.00% | 0.0% | 0.0% | 0.0% | |
| Pyoderma | 0 | 1 | 0 | 1 | 0.571 |
| | 0.00% | 14.3% | 0.0% | 11.1% | |
| Candidiasis | 0 | 0 | 0 | 0 | -- |
| | 0.00% | 0.0% | 0.0% | 0.0% | |
| Scabies | 0 | 1 | 0 | 1 | 0.047* |
| | 0.00% | 14.3% | 0.0% | 11.1% | |
| **Infective Lesions** | 0 | 2 | 0 | 2 | **0.284** |
| | 0.00% | 28.6% | 0.0% | 22.2% | |
| Xerosis | 0 | 0 | 1 | 1 | 0.571 |
| | 0.00% | 0.0% | 50.0% | 11.1% | |
| Hyperpigmentation | 0 | 0 | 0 | 0 | -- |
| | 0.00% | 0.0% | 0.0% | 0.0% | |
| Lichenoid | 0 | 0 | 0 | 0 | -- |
| | 0.00% | 0.0% | 0.0% | 0.0% | |
| Aphthous ulcer | 0 | 0 | 0 | 0 | -- |
| | 0.00% | 0.0% | 0.0% | 0.0% | |
| Papulopruritic | 0 | 3 | 1 | 4 | 0.858 |
| | 0.00% | 42.9% | 50.0% | 44.4% | |
| **Non infective** | 0 | 3 | 2 | 5 | 1.000 |
| | 0.00% | 42.9% | 100.0% | 55.6% | |

| | | | | | |
|---|---|---|---|---|---|
| No Lesion | 0 | 2 | 0 | 2 | 1.000 |
| | 0.00% | 28.6% | 0.0% | 22.2% | |

**Table – 3:** Prevalence of Dermatological Lesions in relation to CD4 count among study subjects above 5yrs of age

| **Lesion** | **CD4 Count** | | | **Total N=91** | **p value** |
|---|---|---|---|---|---|
| | **<200 N=8** | **201 – 500 N=19** | **>500 N=64** | | |
| Molluscum | 0 | 0 | 3 | 3 | 0.520 |
| | 0.0% | 0.0% | 4.7% | 3.3% | |
| Herpes Zoster | 3 | 0 | 0 | 3 | 0.000* |
| | 37.5% | 0.0% | 0.0% | 3.3% | |
| Pyoderma | 1 | 0 | 1 | 2 | 0.106 |
| | 12.5% | 0.0% | 1.6% | 2.2% | |
| Candidiasis | 2 | 0 | 2 | 4 | 0.010* |
| | 25.0% | 0.0% | 3.1% | 4.4% | |
| Scabies | 0 | 3 | 1 | 4 | 0.024* |
| | 0.0% | 15.8% | 1.6% | 4.4% | |
| **Infective Lesions** | 6 | 3 | 7 | 16 | 0.000* |
| | 75.0% | 15.8% | 10.9% | 17.6% | |
| Xerosis | 1 | 3 | 12 | 16 | 0.885 |
| | 12.5% | 15.8% | 18.8% | 17.6% | |
| Hyperpigmentation | 1 | 0 | 3 | 4 | 0.344 |
| | 12.5% | 0.0% | 4.7% | 4.4% | |
| Lichenoid | 0 | 1 | 0 | 1 | 0.147 |
| | 0.0% | 5.3% | 0.0% | 1.1% | |
| Aphthous ulcer | 5 | 4 | 3 | 12 | 0.000* |
| | 62.5% | 21.1% | 4.7% | 13.2% | |
| Papulopruritic | 2 | 4 | 7 | 13 | 0.359 |
| | 25.0% | 21.1% | 10.9% | 14.3% | |
| **Non infective** | 9 | 12 | 25 | 46 | 0.034* |
| | 112.5% | 63.2% | 39.1% | 50.5% | |
| No Lesion | 1 | 8 | 39 | 48 | 0.020* |
| | 12.5% | 42.1% | 60.9% | 52.7% | |

Table 2 and 3 depicts the prevalence of skin manifestations in regard to CD4 count in different age groups. Among children less than 5 years of age, prevalence of scabies was significantly higher when CD4 counts were less than 1000. Among children more than 5 years of age, the prevalence of infective lesions in total, HZ, CANDIDIASIS, APHTHOUS ULCER AND NON-INFECTIVE lesions in total were found higher when CD4 counts were less than 200. Prevalence of scabies was higher in 201 to 500 groups. These differences were statistically significant. Children above 5 years were more susceptible to skin manifestations as compared to younger age group.

The mean CD4 count was highest in MOLLUSCUM (905.00) and least in APHTHOUS ULCER (336.75) patients.Molluscum can be considered as an early cutaneous marker for HIV/AIDS. The prevalence of infective lesions in total, HZ, and APHTHOUS ULCERS was significantly higher when immunosuppression was severe.

## IV. Discussion

The increasing trend in the Paediatric HIV is posing a major health issue in developing and developed nations. A total of 100 children were included in the study with the modal age group of 5-10 years similar to MILLEMBE[7] study. In our study 68% were completely immunized, which is comparable to SHILPA[8] study in which 60% were immunized, hence showing the improved immunization status at a government hospital.The predominant mode of transmission in the present study is by Perinatal mode (92%) which is comparable to Kondreddy[9] study (96.15%) and Gummadivandanausha sree[10] study (100%).

In the present study 42% cases were underweight when compared to 68.27% in Kondreddy[9] study and 91% in Gummadivandanausha sree[10] study. In present study majority of children were in stage 1 and are on prolonged ART therapy along with better care, treatment and adherence to therapy at Niloufer ART centre is indicative of the lower underweight percent. The percent in other studies may vary because their subjects were in stage III/IV.In present study 50% had skin lesions, which is in accordance with Okechukwu[11] study. Other studies showed high percentage of skin lesions which can be due to geographical variations, endemic factors, stage of cases, duration of ART and adherence to treatment.In present study 77.77% of children less than 5 years had skin lesions was observed.Non infectious lesions were predominant in our study which was not comparable to other studies where infectious lesions were more prominent[7,12].

In present study more cutaneous lesions were observed in stage 3 followed by stage 4(100% & 50%)which is statistically significant. In MILLEMBE[7] and ENDAYEHU[12] study cutaneous lesions were more observed in stage 4(100 &88.9%). The lower incidence in stage 4 compared to stage 3 can be attributed to the lower number of children in stage 4 in our study.From above data, it can possibly be concluded that lesions like XEROSIS is seen in early stages, PPD is seen in all stages and lesions like APTHOUS ULCER, CANDIDIASIS,SCABIES,HERPES ZOSTER occur in increased frequency in later stages .The incidence of cutaneous lesions among children on ART, in present study is 60.29%, which is low compared to MILLEMBE study[7] (71%). For ART to havea significant effect on mucocutaneous disordes, it needto be administered for a longer period of time. In a studyby DONIC[13], it was found that the use of ART for abouttwo years reduced significantly the presence of ORAL CANDIDOSISAND SEBORRHEIC DERMATITIS which could be the reason of less percentage seen in our study.

In present study, no immunosuppression, moderate and severe immunosuppression40.29%, 64%, and 87.5% had skin lesions respectively, which depicts that as the immunosuppression increases skin lesions increase which is in accordance with other studies[7,12].All these studies indicate that the risk of acquiring mucocutaneous disorders among HIV infected children rises as the level of immunosuppression advances.From the above findings it can be concluded , that the prevalence of MUCOCUTANEOUS DISORDERS increases as CD4 count decreases, which is statistically significant and also in accordance with other studies. In less than 5 years of age, results are not in accordance with that as only few cases have been reported in present study. Among children more than 5 years of age, the prevalence of infective lesions in total, HZ, CANDIDIASIS, APHTHOUS ULCER and non-infective lesions in total were found higher when CD4 counts were less than 200(p value-0.000). Prevalence of scabies was higher in 201 to 500 groups. These differences were statistically significant. Prevalence of APTHOUS ULCER is also increasing with decreasing cd4 count, which is also statistically significant(p value 0.000).

Dermatological lesions in HIV can indicate waning immunity, therefore indicating the need for CD4 assessment and the need for ART.The type and the characteristics of various MUCOCUTANEOUS DISORDERS seen in HIV co-relate well with the CD 4 counts and can help predict the degree of immunodeficiency with fair precision. Such knowledge is especially helpful in resource poor countries like ours where availability of CD4 counts is limited.

## V. Conclusion

Skin manifestations are a common occurrence in HIV-infected children and their pattern can help predict the severity of the disease. Dermatological lesions in HIV can indicate waning immunity, therefore indicating the need for CD4 assessment and the need for ART.

## Refernces


[1]. Antiretroviral drugs for treating pregnant women and preventing HIV infection in infants: Recommendations for a public health approach. 2010 version. World Health Organization. Available from: http://whqlibdoc.who.int/publications/2010/9789241599818_eng.pdf. [Accessed July 7, 2011]

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