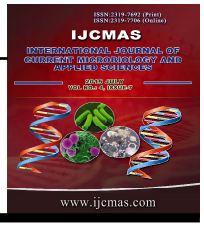
Int. J. Curr. Microbiol. App. Sci (2015) 4(7): 498-510

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 4 Number 7 (2015) pp. 498-510**
http://www. ijcmas. com



Original Research Article

Correlation between Cutaneous Manifestations and Degree of Immunosuppression (CD-4 Count) in Sero-Positive Patients –A Study done in Tertiary Level Hospital of Western Rajasthan, India

Prabhu Prakash[1]*, Chandan Mal[2], Arvind Mathur[3] and M. K. Singhi[2]

[1]ICTC & Microbiology, MDM Hospital, Dr. SNMC, Jodhpur, India
[2]Skin &VD Dept., MDM Hospital, Dr. SNMC, Jodhpur, India
[3]Department Medicine and Incharge ART Center, MDM Hospital, Dr. SNMC, Jodhpur, India
**Corresponding author*

K e y w o r d s

Mucocutaneous disorders,
CD4 count,
HIV,
ART,
ICTC

A B S T R A C T

Mucocutaneous disorders of HIV should be considered as clinical indicators for prediction of underlying immune status, disease progression, management and possible complications of HAART. Aim of the study is to establish a "Correlation between cutaneous manifestations and degree of immunosuppression (CD4 Count) in SERO-Positive patients". All HIV positive patients (Confirmed by ELISA in ICTC centre) having skin manifestations, who attended ART Centre, were included in the study during a period of July 2007 to August 2008. –Skin scrapings, swab/aspirate from lesions were processed in microbiology department for KOH examination, Wet mount examination, Gram's staining, ZN staining, Tzanck smear for Giemsa or Wright stain, Dark field microscopy (for Syphilitic patient) and Serological examinations were done. Skin biopsies were sent to pathology department for HPE confirmation. Out of 1600 HIV positive patients, 300 (18. 75%) had Mucocutaneous manifestation. 167 (37%) of these were of infectious and 133 non-infectious aetiology. Of these, 43.71% had viral infections, 25.74% had fungal infestations, 16.76% had parasitic infestations and 13.77% had bacterial infections. In those patients without infection, photodermatitis, seborrheic dermatitis, urticaria, xerosis and drug rash were seen. In study time maximum patients were within CD4 count 50 to 200cells/mm^3 (41. 67%), while maximum cases of cutaneous manifestation were seen when CD-4 Count was 200-500cells/mm^3 (49. 07%). Maximum incidence of mucocutaneous candidiasis and herpes simplex were seen in CD4 count <100cells/mm^3. Disseminated fungal infection in form of dermatophytosis, prurigo nodularis and disseminated cutaneous leishmaniasis were seen when CD4 count was between 100-200cells/mm^3. The majority of those viral infections, Scabies dermatological disorders were seen in CD-4 Count range of 200–500 cells/mm^3. Cutaneous manifestations of HIV can be considered as good clinical indicators to predict and assess the underlying immune status in resource-poor countries. There was a fall in the CD4 levels as soon as a patient developed any skin manifestation and the CD 4 levels return to pre-disease status as soon as the disease resolved.

Introduction

HIV-infected persons commonly have cutaneous abnormalities; with very high prevalence (NACO document, 2006; Zalla *et al.,* 1992; Krishnam Raju *et al.,* 2004). Some of the conditions are unique and virtually pathognomonic for HIV disease, for example, Kaposi's sarcoma (KS). Patients with HIV disease often have several simultaneous or sequential cutaneous conditions with a progressively more intransient clinical course, a key to suspecting underlying HIV infection. Cutaneous manifestations of human immunodeficiency virus (HIV) disease may result from HIV infection itself or from opportunistic disorders secondary to the decline in immunocompetence from the disease cutaneous disorders may be the initial signs of HIV-related immunosuppression.

The HIV attacks the helper/ inducer T cells (CD4 cells), resulting in syncytial formation and lysis with slow but progressive destruction of this cell population.

As T helper cell function deteriorates, patient develops different cutaneous manifestations, reflecting deteriorating immune functions. Cutaneous manifestations of human immunodeficiency virus (HIV) disease may result from HIV infection itself or from opportunistic disorders secondary to the decline in immunocompetence from the disease (Garmen and Tying, 2002).

Recognizing HIV-related skin changes may lead to the diagnosis of HIV infection in the early stages, allowing initiation of appropriate antiretroviral therapy.

In general, non-infectious cutaneous abnormalities are not prognostic of rapid progression of immunosuppression, but they may be specific markers of the stage of HIV disease. For instance, eosinophilic folliculitis (Soeprono *et al.,* 1986) virtually always occurs in persons with helper T cell counts below 200. Cutaneous abnormalities may worsen as HIV disease progresses e. g. seborrhoea dermatitis, xerosis (Soeeeprono *et al.,* 1986), or they may appear as a fulminant process.

HIV infection and may be less responsive to usual treatment modalities. A variety of neoplastic, infectious, and non infectious diseases can produce cutaneous manifestations throughout the course of HIV disease. These manifestations may occur more frequently than in persons without HIV.

Viral –infections

In patients infected with HIV, several viruses of the Herpesviridae family may lead to cutaneous disease (Soeeeprono *et al.,* 1986), including chronic perianal and perioral herpetic ulcers caused by herpes simplex virus (HSV), recurrent typical dermatomal zoster caused by herpes zoster virus (HZV), and disseminated cytomegalovirus (CMV) infection, Molluscum Contagiosum (MC).

Fungal –infections

Recurrent and persistent mucocutaneous candidiasis is common in patients with HIV infection. In adults, generalized dermatophytosis, or tineacapitis or Onycomycossis, which is typically caused by *Trichophyton rubrum*, may suggest HIV infection, concurrent Cryptococcal & tuberculosis (skin lesions), disseminating Histoplasmosis (Torssander *et al.,* 1988; Durden and Elenski, 1994; Thappa, 2001) cases were seen in seropositive patients with CD-4 Count <100 /mm^3.

Bacterial infections

Impetigo and folliculitis may be recurrent and persistent in HIV disease, particularly in children. Disseminated furunculosis, gingivitis, gangrenous stomatitis, and abscess formation can occur in patients with HIV infection. Bacillary angiomatosis, which is caused by *Bartonella henselae* and rarely by *Bartonella quintana*, usually manifests as red papules and nodules. Cases of secondary syphilis, scrofuloderma, water cane perineum were seen with CD-4 count <200 cells/mm^3. Tubercular skin lesions as non healing ulcer were seen (Swimming Pool Granuloma) is due to *Mycobacterium marinum* infection cannot be regarded as tuberculous skin lesion & infection with atypical mycobacterium, other pyogenic organism (Barbaro *et al.,* 1989; Le Boit *et al.,* 1989; Arico *et al.,* 1985) were isolated.

Parasitic infestations

Atypical or Norwegian scabies (Liautaud *et al.,* 1989), which is characterized by widespread hyperkeratotic, scaly maculopapular eruptions or crusted plaques, can occur in patients with HIV infection. Atypical disseminated leishmaniasis has been reported in an HIV-infected patient, Cutaneous& Disseminated Leishmaniasis were seen with CD-4 count <200 cells/mm^3. As there was fall in CD-4 count despite of regular treatment disease worsened & patients had poor outcome while patients of oriental sore they responded well to treatment.

Demodexfolliculorum folliculitis may lead to a pruritic papular eruption (PPE) on the face and the upper part of the trunk in patients with HIV disease. Cases of dermatitis (Rosatelli and Roselino, 2001) eg. Photodermititis, Seborrhoeicdermatitis (Soeeeprono *et al.,* 1986), Allergic contact dermatitis along with urticaria, prurigonodularis (NACO document, 2006), xerosis & drug rashes were commonly encountered non-infectious cutaneous manifestations in seropositive patients. A study by Vin-Christian *et al.* found that photosensitivity in HIV-infected patients appears to be a manifestation of advanced disease due to sensitivity to ultraviolet B light; patients who were most severely affected were sensitive to both UV-B &UV-A light (Rosatelli and Roselino, 2001). Photo-induced lichenoid drug reactions may occur in HIV-infected patients, particularly those with dark skin. In addition, HIV-infected patients may experience drug-induced pigmentation of skin exposed to light.

Miscellaneous Dermatologic Disorders

Dermatologic conditions like, severe aphthous stomatitis, cutaneous vasculitis (possibly caused by CMV or parvovirus B19), pemphigoid, and other autoimmune blistering diseases may beassociated with HIV disease. Atopic disease may be reactivated by HIV disease. Atopic eczema may be severe in children infected with HIV. Increased serum IgE levels have been found in these children (Eisman, 2006); however, increased IgE levels were not correlated with atopic symptoms. Urticaria may occur primarily or as a drug eruption in HIV disease. Cold urticaria has also been associated with HIV disease.

Materials and Methods

The present study was done in Department of Skin, Microbiology and ART centre of Dr. SNMC, Jodhpur from June 2007-August 2008. During this period 1600 patients were registered, out of which 300 were having cutaneous or mucosal disease. All HIV positive patients (confirmed by

ELISA in ICTC centre) having skin manifestations, who were referred to skin OPD, were included in this study. Their CD4 count was done in ICTC centre. Skin scraping/swab/aspirate from lesions were processed in microbiology department of MDM hospital, for KOH examination, Wet mount examination, Gram's staining, ZN staining, Tzanck smear for Giemsa or Wright stain, Dark field microscopy (for Syphilitic patient) and Serological examinations were done. Skin biopsies were sent to pathology department for HPE confirmation.

Observation

In Western Rajasthan ART in centre where >9,400patients are registered & more than 4500 seropositive patients are taken care. In study time, 1600 patients were registered, out of which 300 (18. 75%) had cutaneous manifestations, majority of patients were in age group 35-45 years (55. 66%), from rural (78%) background, non-migratory (78. 66%), married (91. 33%), having literacy up to primary school level (52. 66%) & majority were housewives and farmers by occupation. The majority were heterosexual (92. 67%) & polygamy (64. 66%) was predominantly observed amongst males (96. 47%) in comparison to females (5. 7%) & majority of them had never used any barrier method of contraception {condoms (71. 33%)} in their sexual practice & in 85% of cases spouse were also Seropositive (Table 1).

Results and Discussion

Out of 1600 HIV positive patients (Table 1 & 2), 300 (18. 75%) reported with cutaneous or mucocutaneous manifestation. Out of which 167 (37%) were of infectious aetiology. Maximum incidence was seen in age group 30–45 years, married male (87.7%), who were non migratory (71. 57%), rural population (77%), polygamy (64.66%), with CD4 count 200 to 500cells/mm^3 (44.00%). In infectious aetiology (Table 3), maximum patients had viral infections (43.71%), herpes, pox, molluscum contagiosum, oral hairy leukoplakia etc, parasitic infestation (25. 74%) scabies, disseminated cutaneous leismaniasis, fungal (16.76%) Histoplasmosis, candidiasis etc., bacterial infection (13.77%) Treponemal, *M. leprae* and *M. tuberculosis* etc. In non-infectious patients (Table 4), photodermatitis, seborrhoeic dermatitis, urticaria, xerosis and drug rash, etc were seen. Maximum patients were within CD4 count <200cells/mm^3 (58. 73%) while maximum cases of cutaneous manifestation was seen when CD-4 count was >200cells/mm^3 (53. 33%). Maximum incidence of mucocutaneous Candidiasis & Herpes simplex were seen in CD4 count <100cells/mm^3 (Table 6 & 7). Disseminated fungal infection in form of dermatophytosis, urticaria, prurigo nodularis and disseminated cutaneous leishmaniasis were seen when CD-4 count was mean of 100–200cells/mm^3. While majority of non–infectious &Viral (Herpes, molluscum contagiosum, oral hairy leucoplakia) & scabies were seen in CD-4 count >200–500 cells/mm^3. When ART was instituted with HAART in patients of CD-4 count <100 cases of IRIS were seen in 21cases with flaring of herpes infection in 02, tuberculosis in 16, Cryptococcal in 02 & Histoplasma in one patient. It is a paradoxical reaction seen due to recovery of immunity & rise in CD-4 counts.

HIV infection produces a panorama of mucocutaneous manifestations, which may be the presenting features of the disease (Zalla *et al.,* 1992), varying from macular, roseola-like rash seen during the acute 'seroconversion' syndrome to extensive end-stage Kaposi's sarcoma (Fujii *et al.,* 1999; Krigel and Friedman-Kien, 1990).

Infectious and non-infectious HIV-induced skin diseases may not only serve as the marker of HIV infection, but also as a marker of the stage of HIV disease. Although the cutaneous manifestations of opportunistic infections may serve as the sentinel lesion of a widely disseminated, life threatening infection, the majority of HIV-induced cutaneous diseases are not life threatening, but are cosmetically disfiguring and jeopardise the quality of life of HIV-infected patients. The morphology of HIV-induced skin lesions can be atypical. During acute primary HIV infection, a transient, generalized, morbilliform eruption may develop on the trunk and the arms. In the early asymptomatic stage of HIV disease, which may last from a few years to a decade or longer, no signs of infection other than lymphadenopathy are present (Krishnam Raju *et al.,* 2004).

With the onset of immunosuppression, nonspecific skin changes occur, such as common disorders with atypical clinical features, including recurrent varicella zoster, numerous hyperkeratotic warts, treatment-resistant seborrheic dermatitis (Soeeeprono *et al.,* 1986), and oral hairy leukoplakia (Alessi *et al.,* 1990).

In the later stages of HIV disease, chronic herpes simplex virus (HSV), molluscum contagiosum (MC), and cytomegalovirus (CMV) infections appear. The prevalence of clinically apparent MC infection varies from 5-18% in different series. Mycobacterial infections and mucocutaneous candidiasis can occur commonly (Glesby *et al.,* 1995).

A 42-month prospective study by Smith *et al.* (1993) in 912 HIV-1–infected patients found that condylomata acuminata and verrucae are observed early, and their frequency does not increase as the disease progresses, whereas the incidence of HSV infections, Molluscum Contagiosum (Katzman *et al.,* 1987) and oral hairy leukoplakia (Alessi *et al.,* 1990) increases as the disease advances.

Verrucous herpes infection, leprosy, condylomalike molluscum contagiosum, and AIDS-associated pigmented or nonpigmented erythroderma may be seen in early HIV disease or as part of immune restoration syndrome after the initiation of antiretroviral therapy. Leishmaniasis and miliary tuberculosis have been reported in advanced HIV disease. Kaposi's sarcoma (KS) and *Penicillium marneffei* infection were not observed in our study, although these have been occasionally reported from India. The possible reason for the non-occurrence of the KS in our population may be the low prevalence of theHSV-8 and very less number of the homosexual transmission of the HIV which is also an important risk factor for the KS (Krigel *et al.,* 1990; Smith *et al.,* 1993). Almost all skin manifestations, with marked exception of the dermatophyte infection and scabies, are good markers of declining immunity in this population. Another interesting finding was that, despite being on HAART therapy (this excludes drug resistance), the CD4 levels recovered as soon as the infection resolved.

This study incorporated 1600 patients and the high prevalence was seen in male and across the globe, almost all the studies have reported a male preponderance in those suffering from HIV infection. In enrolled patients, 98.47% male and 79.05% female were literate which is much higher than literacy level of Rajasthan (census 2001; male literacy 61.05%, female literacy 44.34%). This might be due to under reporting of illiterate patient. In our study, 92.66% patients were heterosexual,64.66% were polygamy & in 85% of cases spouse

were also HIV positive. Maximum patients were in age range of 30–45 years (in both sexes) this observation was also found in studies of Thappa (2001), this also correlates well with this being the most sexually active period in any person's life. There were patients seen in Geriatric & paediatric population (6.66% & 6.33% respectively) but their incidence was very less though in our area HIV is also seen in geriatric population (Prakash and Gupta, 2005) there numbers are increasing constantly.

Oppurtunistic fungal infections (Thappa, 2001) are commonly encountered in AIDS patients Cryptococcus, Histoplasmosis, Dermatophytes) Candidiasis are most common pathogenic fungi in HIV disease. In parasitic group scabies, leishmaniasis, DCL were seen. In study done by Kumarasamy *et al.* (2008) scabies was in 0.5% of cases and in study of Thappa (2001) it was in 2.3% cases. Herpes, molluscum contagiosum, Oral Hairy Leucoplakia (OHL), secondary syphilis, Bacillary angiomatosis, scrofuloderma cases were seen. In our study there was no patient of Kaposi's sarcoma. In many studies its seen that incidence of Kaposi Sarcoma is very low, in Western countries also all cases of KS were in homosexuals and rather rare in IV Drug users, women and heterosexuals and infection by HSV-8 is rare in our geographical area (Krigel *et al.,* 1990; Smith *et al.,* 1993).

In Non- Infectious category cases of drug rashes (Coopman *et al.,* 1993) were seen. Drug eruptions often occur in patients receiving treatment for HIV infection. Antibiotics that are used in the treatment of HIV patients, including sulfa drugs (Gordin *et al.,* 1984), penicillin, cephalosporins, and dapsone, may cause drug eruptions, ranging from benign maculopapular lesions to fatal hypersensitivity reactions. Antiretroviral medications also have many cutaneous side effects.

Abacavir, a nucleoside reverse transcriptase inhibitor, may cause a potentially fatal hypersensitivity syndrome, which manifests as progressive, multiorgan system symptoms, including fever; shortness of breath; malaise; gastrointestinal side effects including nausea, vomiting, and diarrhea; and an erythematous (red) rash.

Nonnucleoside reverse transcriptase inhibitors, most notably nevirapine, are frequently associated with pruritic, maculopapular skin eruptions. Nonnucleoside reverse transcriptase inhibitors are also rarely associated with Stevens-Johnson syndrome and toxic epidermal necrolysis, a potentially fatal drug eruption with sloughing of the skin and mucous membranes. Protease inhibitors may also cause a rash and have been rarely implicated in Stevens-Johnson syndrome and toxic epidermal necrolysis (Bayard *et al.,* 1992).

Seborrheic dermatitis occurs in up to 85% of adults and children with HIV infection and may be an early sign of HIV. Seborrheic dermatitis is characterized by thick, yellow scaling areas that may have surrounding erythema (redness) and may occur on the scalp, face, skin folds, and/or diaper area. Older children and adults may also have involvement of the nasolabial folds, the skin behind the ears, and the eyebrows. In our study 13 (9. 77%) patients had seborrheic dermatitis and in our study there was low incidence in comparison to western countries (Soeeeprono *et al.,* 1986).

Large number of patients presented as prurigo nodularis, vasculitis, pustular folliculitis and as Jodhpur is known as Suncity 35 (26.31%) cases of

photosensitivity were seen, few having atypical presentation.

When they were categorised according to CD-4 count, 58.73% were having CD-4 count <200cells/mm^3, 92.99% of patients without skin manifestation were having CD-4 count <200cells/mm^3, while maximum patient those who had skin manifestation (18.75%)their CD-4 count was 200–500 cells/mm^{3}in 53.33%. This signifies that maximum cases of cutaneous manifestation are seen within CD-4 count >200cells/mm^3 when clinically patients are healthy and HIV is not diagnosed. In our study when CD-4 count was <100 commonest manifestations were oral candidiasis & herpes simplex. In CD-4 count 100–200 dermatophytosis, urticaria & prurigo nodularis were seen.

Table. 1 Total study outline

Total patients in study group	1600
Male: Female	65% : 35%
Pateints with cutaneous manifestation. Infectious: NonInfectious	300 55. 67% : 44. 33%
Rural: Urban	77% : 23%
Migratory:Non-migratory	21. 33% : 78. 66%
Married: Unmarried	91. 33% : 8. 67%
Heterosexual: Homosexual	92. 66%: 7. 34%
Polygamy: Monogamy	64. 66%:35. 33%
Spouse positive: Spouse negative	85% :10%
Illiterate: Pri. education: Graduate	8. 33%:73. 01% :18. 66%

Table. 2 Age & sex distribution

Age	Male		Female		Total	
	No.	%	No.	%	No.	%
<15	16	5. 33	3	1. 00	19	6. 33
15-30	53	17. 66	41	13. 66	94	31. 33
30-45	107	35. 66	60	20. 00	167	55. 66
>45	19	6. 33	1	0. 33	20	6. 66
Total	195	65	105	35	300	100

Table. 3 Clinical profile of infectious diseases (167 cases)

S. No.	Infectious Diseases	Total No. (167)	%age
1.	Fungal	28	9. 33
	a) Dermatophytosis.	13	4. 33
	b) Tineaversicolor	2	0. 66
	c) Histoplasmosis	3	1. 00
	d) Oral candidiasis	7	2. 33
	e) V. V Candidiasis	3	1. 00
2.	Viral	73	24. 33
	a) Herpes zoster	18	6. 00
	b) Herpes genitalis	14	4. 66
	c) Herpes simplex	5	1. 66
	d) Molluscumcontagiosum	20	6. 66
	e) Genital warts	9	3. 00
	f) Chicken pox	7	2. 33
3.	Protozoal	43	14. 33
	a) Oriental sore	06	1. 00
	b) Diffuse cutaneous Leishmaniasis(DCL)	03 34	0. 33 11. 33
	c) Scabies		
4.	Bacterial	23	7. 66
	a) Folliculitis	11	3. 33
	b) Syphilis	7	2. 33
	c) Cancroids	1	0. 33
	d) Gonorrhoea	2	0. 66
	e) Leprosy	1	0. 33
	f) Scrofuloderma	1	0. 33

Diagnosis was based on confirmed laboratory reports

Table. 4 Clinical profile of non-infectious diseases (133 cases)

NON –INFECTITOUS DISEASE (NUMBER OF PTS 133)	
Photodermatitis	25
Dermatitis	15
Urticaria	13
Prurigo nodularis, Xerosis, Drug rash	12 each
Lichensimplex chronicus	07
Lichen planus	05
Hairy cell leucoplakia	04
Vasculitis, Post herpatic neuralgia, TEN, Ap. Ulcer, ACD	02 each
BCE, DLE, Vitiligo, Psoriasis, Pyoderma, etc.	01 each

Table. 5 %age of patients having cutaneous manifestation in various CD4 groups

CD4 Count group	Total Patients =1600		Total Patients with Cutaneous manifestations = 300	
	No. of Patients	%age	No. of Patients	%age
< 50	282	17. 06	24	8. 00
50 – 200	1067	41. 07	116	38. 66
200 – 500	269	16. 81	132	44. 00
>500	41	2. 56	28	9. 33

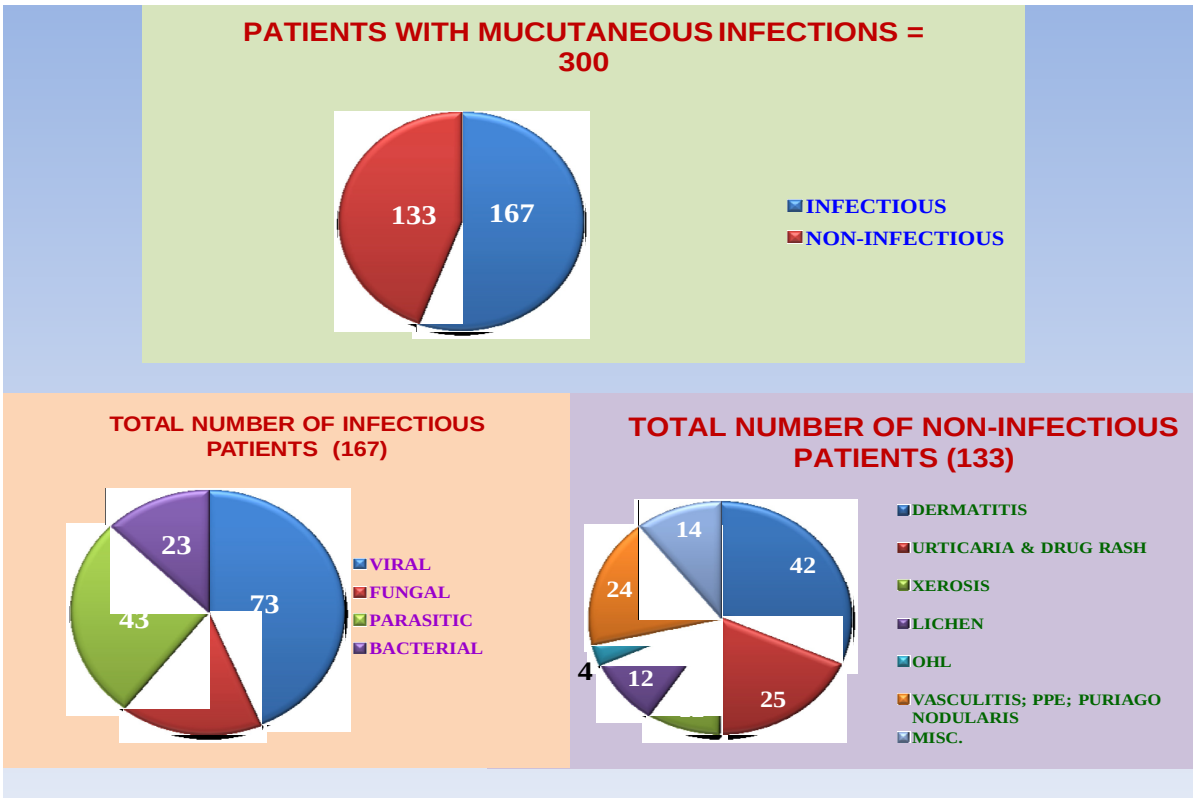
Table. 6 Relationship of mucocutaneous disorders & CD4 Count

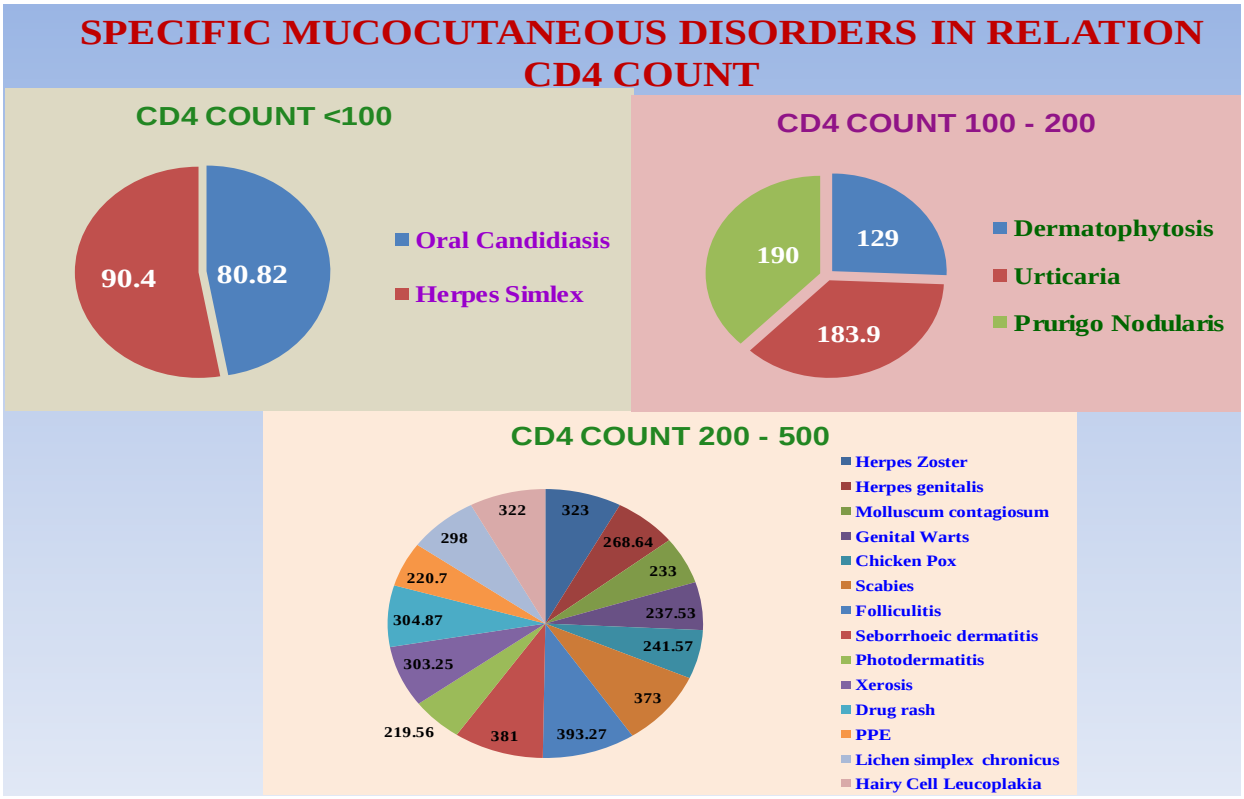
S. No.	Mucocutaneous Disorders	Mean CD4 Count (Cell/mm^3)
1.	Fungal a) Dermatophytosis b) Oral candidiasis	 129 80. 84
2.	Viral a) Herpes zoster b) Herpes genitalis c) Herpes simplex d) Molluscumcontagiosum e) Genital warts f) Chicken pox	 323 268. 64 90. 4 233 237. 53 241. 57
3.	Infestation Scabies	 373
4.	Folliculitis	393. 27
5.	Seborrhoeic dermatitis	381
6.	Prurigonodularis	190
7.	Photodermatitis	219. 56
8.	Urticaria	183. 90
9.	Xerosis	303. 25
10.	Drug rash	304. 87
11.	PPE	220. 7
12.	Lichen simplex chronicus	298
13.	Hairy cell leucoplakia	322

Table. 7 Specific mucocutaneous disorders

S. No.	CD4 count (cells/mm^3)	Mucocutaneous Disorder	Mean CD4 count (cells/mm^3)
1.	<100	Oral Candidiasis Herpes Simlex	80. 82 90. 40
2.	100-200	Dermatophytosis Urticaria Prurigo nodularis	129 183. 90 190

3.	200 - 500	Herpes Zoster	323
		Herpes genitalis	268. 64
		Molluscumcontagiosum	233
		Genital Warts	237. 53
		Chicken Pox	241. 57
		Scabies	373
		Folliculitis	393. 27
		Seborrhoeic dermatitis	381
		Photodermatitis	219. 56
		Xerosis	303. 25
		Drug rash	304. 87
		PPE	220. 7
		Lichen simplex chronicus	298
		Hairy Cell Leucoplakia	322





There were 43 different disease types of Mucocutaneous disorders associated with HIV/AIDS from our present study when CD-4 Count was ranging from 200- 500. Comparison of these disease occurrences with its frequency and effect of ART therapy was also carried out to support this correlation. As in our observation when patient was put on treatment there was clinical improvement in skin manifestation. So we can say 'Skin is Mirror Image Of Immunodeficiency".

Dermatological manifestations are seen at every stage of HIV/AIDS, and are often the presenting features. These manifestations not only act as markers but also reflect the underlying immune status.

As there is fall in CD4 count, all HIV positive patients should be screened regularly for concurrent skin manifestation. Antifungal prophylaxis should be given to prevent disseminated opportunistic fungal infection. Monitoring of CD4 count should be done regularly at 3 months interval to know the T cell mediated immunity as one in every fifth patients of HIV had mucocutaneous manifestations. Incidence of Molluscum and Dermatophytes were seems to be lower in patient receiving HAART.

1) There is a strong negative association between CD4counts and the incidence and severity of skin diseases in the HIV/AIDS patients.
2) Cutaneous manifestations of HIV can be considered as good clinical indicators to predict and assess the underlying immune status in resource-poor countries.
3) There was a fall in the CD4 levels as soon as a patient developed any skin manifestation and the CD 4 levels return

to pre-disease status as soon as the disease solved.

4) Though this phenomenon (the fall in the CD4 levels during skin diseases and its recovery after the improvement of those diseases) was prominent for some diseases (all, except for scabies, psoriasis, and folliculitis in the present study), it needs further studies to establish the pathophysiology.
5) It is not advisable to take into account the CD4 levels, if the patient is having active dermatological infections as CD 4 levels may be falsely low.
6) Maximum cases of Viral (73), protozoal (43) cutaneous infection were seen. may be routine antifungal - fluconazole or sulphamethaxazole prophylaxis (given for PCP) when their CD-4 Count is <200 cells/mm^3 prevents against fungal & bacterial mucocutaneous lesions also.

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