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ORIGINAL ARTICLE

Current Prevalence and Characteristics of Dermatoses Associated with Human Immunodeficiency Virus Infection

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KEYWORDS
Human immunodeficiency virus;
Highly active antiretroviral therapy;
Skin disease

Abstract
Introduction: The introduction of highly active antiretroviral therapy has produced a substantial change in the natural history of human immunodeficiency virus (HIV) infection. The frequency of opportunistic infections and AIDS-related cancers has fallen, though new health problems have developed. Likewise, there has been a change in the spectrum of skin diseases now observed in these patients.
Objective: To analyze the prevalence and characteristics of skin disease in a group of HIV-infected outpatients.
Methods: A cross-sectional, observational study was performed. All patients who attended the day care unit of the infectious diseases department over a 6-month period (May-October, 2003) were offered the possibility of complete dermatologic examination. Epidemiologic and clinical variables were recorded in all participants, together with the findings on examination of the skin. A comparative study was performed, grouping the patients according to CD4-lymphocyte count and antiretroviral treatment.
Results: The prevalence of dermatoses in the study patients was 98.3%. The most common conditions were xerosis (114 patients, 37.6%), seborrheic dermatitis (94 patients, 31%), distal subungual onychomycosis (80 patients, 26.4%), and viral warts (65 patients, 21.4%). Grouped by etiology, infectious diseases were the most common (68.6%), followed by inflammatory diseases (47.5%).
Conclusion: Mucocutaneous lesions continue to be very common in HIV-infected patients, although there has been a qualitative change in the conditions that these patients present.

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PALABRAS CLAVE
Virus de la immunodeficiencia humana;
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Dermatosis

Prevalencia y características de las dermatosis relacionadas con la infección por VIH en la actualidad

Resumen

Introducción: La introducción del tratamiento antirretroviral de gran actividad (TARGA) ha supuesto un cambio profundo en la historia natural de la infección por VIH. Las infecciones oportunistas y las neoplasias asociadas a sida han visto reducida su frecuencia, a la vez que han dado paso a nuevos problemas de salud. De igual manera, el espectro de la patología cutánea que actualmente observamos en estos pacientes se ha visto modificado.

Objetivo: Analizar la prevalencia y características de la patología cutánea en una serie de pacientes ambulatorios con infección por VIH.

Métodos: Estudio transversal, observacional. A todos los pacientes que acudieron al Hospital de Día de la Unidad de Enfermedades Infecciosas durante un periodo de seis meses (mayo-octubre 2003) se les ofreció la posibilidad de la realización de un examen dermatológico completo. Se registraron las variables epidemiológicas y clínicas de todos los participantes y los hallazgos de la exploración cutánea. Los pacientes fueron estudiados comparativamente según su recuento de linfocitos CD4 y si realizaban o no tratamiento antirretroviral.

Resultados: La frecuencia de dermatosis en los pacientes del estudio fue del 98,3%. Las entidades más frecuentes fueron: xerosis (114 pacientes, 37,6%); dermatitis seborreica (94 pacientes, 31%); onicomicosis subungueal distal (80 pacientes, 26,4%) y verrugas vulgares (65 pacientes, 21,4%). Agrupadas por categorías, la patología infecciosa fue la más frecuente (68,6%), seguida de la patología inflamatoria (47,5%).

Conclusiones: Las lesiones cutáneo-mucosas continúan siendo muy frecuentes en los pacientes con infección por VIH, aunque se ha producido un cambio cualitativo en la patología que presentan.

Introduction

First applied in 1996, highly active antiretroviral therapy (HAART) is the term referring to the combination of antiretroviral drugs that is highly effective against HIV infection. The combination generally contains 2 nucleoside reverse transcriptase inhibitors (NRTIs) with at least 1 third drug, usually a protease inhibitor (PI) or a nonnucleoside reverse transcriptase inhibitor (NNRTI). Today, the introduction of new antiretroviral drug families, such as integrase inhibitors or CCR5 coreceptor antagonists, has paved the way for new combinations, especially in the context of rescue therapy.[1]

The effectiveness of HAART has modified the natural history of HIV infection. Consequently, the incidence of processes associated with immunodeficiency caused by chronic HIV infection, eg, opportunistic infections or AIDS-related cancer, have fallen dramatically, thus leading to a significant increase in survival.[2] However, health problems that were once uncommon in this population have begun to emerge, compromising quality of life and even life expectancy.[3]

Similarly, although the spectrum of skin diseases we now see in this group has changed, skin complaints remain common. Skin diseases that were traditionally associated with HIV infection have given way to other apparently less severe problems that, nevertheless, have important consequences for a patient's physical appearance, social relationships, and quality of life. Occasionally, antiretroviral drugs themselves cause skin disorders.

Changes have occurred not only in the skin diseases themselves, but also in the way they are perceived by patients. At present, most HIV-infected patients taking efficacious HAART are more concerned with the image they present to other people, especially alterations in physical appearance brought about by lipodystrophy and skin diseases; therefore, they often attend the dermatology department. However, in the case of patients who attribute less importance to self-care, skin disease is not taken into consideration by the patient or the attending health professionals.

Very few studies have analyzed skin disease after the introduction of HAART in Spain. Our objective was to analyze the prevalence and characteristics of skin disease in a series of HIV-infected outpatients.

Patients and Methods

We performed a cross-sectional observational study of HIV-infected outpatients aged over 18 years who attended the day hospital of our infectious diseases unit between May

and October 2003. Participation was voluntary and signed informed consent was obtained. Patients who agreed to participate were referred directly to the dermatology clinic.

Irrespective of whether the patients invited to participate actually did so, we collected analytical, clinical, and epidemiological variables associated with HIV infection. We also collected information on hepatitis C virus (HCV) infection and lipodystrophy.

Main Variable: Diagnosis of Skin Disease

The dermatology protocol included a detailed clinical history and a complete physical examination, with a meticulous exploration of the skin, mucosa, and hair and nails. If a skin disease was detected, the patient was informed and offered appropriate treatment and follow-up. If the diagnosis was unclear, a second observer confirmed the diagnosis and, when necessary, the relevant additional tests were performed, as follows: skin biopsy, immunofluorescence study, microbiological culture, direct microscopic examination of fungi with potassium hydroxide, and blood tests. Skin diseases were detected and categorized according to the *International Classification of Diseases, Ninth Revision*, adapted to dermatology.[4]

Explanatory Variables

Explanatory variables were recorded from the clinical history where necessary using the computerized registers of the microbiology and clinical analysis laboratory. We included the following epidemiological variables: age, sex, social status (pensioner, nonpensioner, prisoner), availability of a place to live, active drug addiction when the study was performed, and alcoholism.

Clinical and Analytical Variables Associated With HIV Infection

1. HIV risk practice: intravenous transmission (intravenous drug use [IVDU], transfusion of blood or blood derivatives, and organ and tissue transplant); sexual transmission (homosexual or heterosexual relations); and other (when it was not possible to establish the mechanism).
2. HIV clinical stage: We used the 1993 HIV classification for adults and adolescents (>13 years) of the Centers for Disease Control and Prevention (CDC). Patients with conditions in category C were considered to have AIDS.
3. $CD4^+$ lymphocyte count (cells/mm^3) at inclusion.
4. HIV plasma viral load (copies/mL) at inclusion.
5. Current antiretroviral treatment: we recorded whether or not the patient was receiving antiretroviral treatment, as well as the combination of drugs comprising the regimen. Drugs were classed as NRTIs, NNRTIs, and PIs.
6. Chronic hepatitis C (positive HCV RNA titer).
7. Lipodystrophy

Data Analysis

Data were analyzed in several stages. First, the possibility of selection bias was investigated. We created 3 independent databases: patients who had agreed to participate in the study, those who had refused to participate, and those who agreed to participate but did not attend the visits. We recorded epidemiological, clinical, and analytical data on HIV infection, as well as the presence of chronic HCV infection, antiretroviral treatment administered, and the presence/absence of lipodystrophy. These data were subsequently compared.

We then determined the prevalence of skin disease, which was considered to be the number of times a diagnosis corresponding to a skin condition was recorded in the study sample.

Skin diseases were then grouped as follows: infectious skin disease, inflammatory skin disease, tumoral skin disease (subdivided into benign and malignant neoplasms), toxicoderma, xerosis and related disorders (xerosis itself and acquired ichthyosis, keratosis pilaris, pityriasis alba, plantar hyperkeratosis, adult topical dermatosis), and other abnormalities (including abnormalities of the mucosa, nails, pigmentation, vasculature, or hair that did not fit in the previous categories).

We then selected the most common skin disorders and those traditionally considered associated with HIV infection to study potentially related factors.

Statistical Analysis

The statistical analysis was performed using SPSS, version 11.0 for Windows (SPSS Inc, Chicago, Illinois, USA). Qualitative variables were presented as absolute and relative (percentage) frequencies. As quantitative variables followed a nonparametric distribution, we used the median as a measure of central tendency and the interquartile range as a measure of dispersion. The type of distribution of the variables was verified using the Kolmogorov-Smirnov test. Associations between qualitative variables were assessed using the χ^2 test or Fisher exact test. The Mann-Whitney test was used to compare groups of quantitative variables. Statistical significance was set at a P value of <.05.

Results

When the study was performed, 780 HIV-infected patients were under the care of the Infectious Diseases Unit of Hospital General Universitario, Alicante, Spain; 540 of these patients were taking antiretroviral therapy. During the 6-month data collection period (May-October, 2003), 447 outpatients were invited to participate in the study; 352 agreed and 95 refused. Of the 352 patients who signed the informed consent document, 303 (86.0%) attended the dermatology clinic. In order to rule out the existence of selection bias among these 303 patients, we compared the 3 groups of patients: those who signed and participated, those who signed and did not participate, and those who refused to participate at the outset. Significant differences were only found with respect to availability of a place to live, which was greater in those patients who did not participate (P<.05), and a lower proportion of IVDU than the other risk practices in the group that did attend

the interview with the dermatologist. There were no statistically significant differences between the 3 groups with respect to presence of lipodystrophy.

Description of the Sample That Participated in the Dermatologic Protocol

The descriptive analysis of the 303 participants is presented in Table 1. The youngest patient was 21 and the oldest 75.

Clinical and analytical characteristics associated with HIV infection are summarized in Table 2. The median $CD4^+$ T lymphocyte count was 426 cells/mm^3 (268-652; range, 13-1725). $CD4^+$ T lymphocyte counts greater than 500 cells/mm^3 were observed in 26 patients (8.6%).

As for antiretroviral therapy, the most frequent combination among the study participants was 2 NRTIs and 1 NNRTI (34.3% of the study patients and 47.4% of patients receiving antiretroviral treatment). Antiretroviral-naïve patients (those who had never received antiretroviral therapy [35 patients]) accounted for 11.6% of the study sample and 41.7% of patients who were not receiving treatment at inclusion.

At the time of the interview, 121 patients (39.9%) had chronic HCV infection.

Facial lipoatrophy was observed in 90 of the 303 patients (29.7%); however, it was present in 41% of patients on HAART. Lipoatrophy affected the limbs in 76 patients (25.1% of the total and 34.7% of patients on antiretroviral therapy). Lipohypertrophy was detected in 20 patients (6.6% of the total and 9.1% of patients on antiretroviral therapy).

Table 1 Epidemiologic Characteristics of the Study Participants

Epidemiologic Characteristics	N=303
Sex (n=303)[a]	
Men	76.2% (231)
Women	23.8% (72)
Race (n=303)	
White	98.7% (299)
Black	1.3% (4)
Median (IQR) age, y (n=303)	39 (34-45)
Active drug addiction (n=303)	
Yes	1.0% (3)
No	99.0% (300)
Alcoholism (n=301)	
Yes	10.0% (30)
No	90.0% (271)
Social status (n=274)	
Pensioner	30.7% (84)
Nonpensioner	66.1% (181)
Prisoner	3.3% (9)
Place to live (n=209)	
Yes	86.6% (181)
No	5.3% (11)
Residential home	3.8% (8)
Prison	4.3% (9)

[a]The figures in parenthesis represent the total number of patients for whom the variable was available and that was used to calculate the percentage.

Skin Diseases

Of the 303 patients studied, 298 (98.3%) had at least 1 skin disease. Only 5 patients (1.7%) had none. The study sample presented a median of 3 (2-4) skin conditions.

A total of 121 different conditions were detected. The most common diagnoses are presented in Table 3. The most frequent was cutaneous xerosis (114 patients, 37.6%), followed by seborrheic dermatitis (94 patients, 31%), distal subungual onychomycosis (80 patients, 26.4%), and common warts (65 patients, 21.4%). Also noteworthy is the high prevalence of saburral tongue (34 patients, 11.2%) and fissured (scrotal) tongue (24 patients, 7.9%).

The frequency of skin diseases grouped by categories is summarized in Table 4. Infectious disease was the most common (208 diagnoses, 68.8%), followed by inflammatory conditions (144 diagnoses, 47.5%) and xerosis/related disorders (123 diagnoses, 40.6%).

Table 5 compares the frequency according to $CD4^+$ T lymphocyte count of the most common skin diseases in the study, as well as some skin conditions traditionally associated with HIV infection. The differences were statistically significant for scrotal tongue (P=.003), nonungual *Candida* infections (P=.014), molluscum contagiosum (P=.001), and acquired melanotic macules (P=.01).

Table 6 groups patients according to whether or not they received antiretroviral therapy and compares the frequency of the most common skin diseases in the study, as well as some skin diseases traditionally associated with HIV infection. The differences were only statistically significant for mucocutaneous candidiasis (P=.03) and herpes simplex (P=.03).

Discussion

Our study revealed a high frequency of skin disease in HIV-infected patients (98.3% of all patients included), with a median of 3 conditions per patient. Infection continues to be the most common cause of skin disease (68.6%) in clinically stable patients, despite the effectiveness of current antiretroviral therapy.

The most frequent skin diseases in the present study were cutaneous xerosis, seborrheic dermatitis, distal subungual onychomycosis, common warts, and nonungual mycosis. Mucocutaneous herpes infections, oral hairy leukoplakia, or Kaposi sarcoma were uncommon—10, 7, and 3 diagnoses,

Table 2 Clinical and Analytical Characteristics of HIV Infection in the Study Patients

Clinical and Analytical Characteristics	N=303
Risk practice (n=303)[a]	
IVDU	38.6% (117)
Blood/blood derivatives	1.0% (3)
Homosexual relations	34.3% (104)
Heterosexual relations	25.4% (77)
Other	0.3% (1)
Homosexual relations + IVDU	0.3% (1)
Clinical stage (n=302)	
A	53.6% (162)
B	14.9% (45)
C	31.5% (95)
Median (IQR) $CD4^+$ T-lymphocyte count, cells/mm^3 (n=300)	426 (268-652)
Most recent CD4+ T-lymphocyte count, cells/mm^3 (n=300)	
<200	17.8% (54)
≥200	81.2% (246)
Median (IQR) viral load, copies/mm^3 (n=297)	50 (0-24 000)
Antiretroviral treatment (n=303)	
Yes	72.3% (219)
No	27.7% (84)
Antiretroviral-naïve (n=303)	
Yes	11.6% (35)
No	88.4% (268)

[a]The figures in parenthesis represent the total number of patients for whom the variable was available and that was used to calculate the percentage.
Abbreviation: IVDU, intravenous drug user.

Table 3 Skin Diseases

Dermatosis	No. of Diagnoses	%
Xerosis	114	37.6
Seborrheic dermatosis	94	31
Distal subungual onychomycosis	80	26.4
Common warts	65	21.4
Nonungual mycosis	61	20.1
Saburral tongue	34	11.2
Longitudinal striation of the nails	25	8.2
Scrotal tongue	24	7.9
Oral candidiasis	16	5.2
Genital warts	14	4.6
Nonspecific folliculitis	13	4.3
Infundibular cyst	13	4.3
Dermatofibroma	12	4
Melasma	12	4
Molluscum contagiosum	12	4
Onychodystrophy	12	4
Plane warts	12	4
Vascular spiders	11	3.6
Lichen simplex chronicus	11	3.6
Psoriasis	11	3.6
Actinic keratosis	11	3.6
Telangiectasis	10	3.3

Table 4 Frequency of Skin Diseases Grouped by Category[a]

Type of Skin Disease	No. of Diagnoses	%
Infectious	208	68.6
Inflammatory	144	47.5
Xerosis and related disorders	123	40.6
Other mucosal abnormalities	63	20.8
Benign tumor	51	16.8
Other nail abnormalities	40	13.2
Pigmentation abnormalities	37	12.2
Other vascular abnormalities	28	9.2
Malignant tumor	17	5.6
Other hair abnormalities	9	2.9
Other skin diseases[b]	8	2.6
Toxicoderma	4	1.3

[a]The percentages are calculated with respect to the number of patients who participated in the study (n=303).
[b]The entry for other skin diseases includes the following: pseudoacanthosis nigricans, pruritus sine materia, generalized hyperhidrosis, diabetic skin disease–type lesions (ie, diabetic skin disease and similar characteristic lesions detected in nondiabetic patients).

respectively—probably as a result of the patients' favorable immune status (median $CD4^+$ T-lymphocyte count of 426 cells/mm^3). There were no reports of eosinophilic folliculitis or HIV-associated pruriginous and papular eruption. A biopsy specimen was taken in the 5 cases with papular lesions of an apparently follicular distribution and involvement of the face, neck, and upper third of the trunk. Histopathology revealed them to be folliculitis caused by *Demodex* species. Toxicoderma was uncommon.

The high frequency of skin complaints among HIV-infected patients is well documented in the literature. Studies from the pre-HAART era showed the prevalence of skin disease to be 80%-100% in HIV-infected patients and that skin disease affected patients at any stage of the infection.[5-13] However, the type and characteristics of the cutaneous manifestations observed varied from one study to another. These differences could be explained by the study population (predominant risk practice, immune status), the period when data were collected, the methodology

Table 5 Skin Diseases Classified According to CD4+ T-Lymphocyte Count

Skin Disease[a]	<200 n=54	≥200 n=246	*P*[b]
Xerosis	25 (46.3%)	89 (36.2%)	NS
Nongenital viral warts	18 (33.3%)	55 (22.4%)	.08
Seborrheic dermatosis	14 (25.9%)	80 (32.5%)	NS
Distal subungual onychomycosis	14 (25.9%)	65 (26.4%)	NS
Scrotal tongue	10 (18.5%)	13 (5.2%)	.003
Other nail abnormalities	9 (16.7%)	28 (11.4%)	NS
Nonungual mycosis	8 (14.8%)	50 (20.3%)	NS
Candidiasis	8 (14.8%)	12 (4.9%)	.014
Molluscum contagiosum	7 (12.9%)	4 (1.6%)	.001
Scrotal tongue	5 (9.2%)	29 (11.7%)	NS
Genital warts	4 (7.4%)	10 (4.0%)	NS
Acquired melanotic macules	4 (7.4%)	2 (0.8%)	.01
Melasma	4 (7.4%)	8 (3.2%)	NS
Dermatofibroma	3 (5.5%)	9 (3.6%)	NS
Eczema	3 (5.6%)	22 (8.9%)	NS
Psoriasis	3 (5.6%)	7 (2.8%)	NS
Bacterial folliculitis	2 (3.7%)	11 (4.4%)	NS
Demodex folliculitis	2 (3.7%)	3 (1.2%)	NS
Toxicoderma	2 (3.7%)	2 (0.8%)	NS

[a]The table includes the most common diagnoses among the study patients.

[b]Statistical significance was set at a *P* value of .05.

Abbreviation: NS, nonsignificant.

used by the health professionals (nurses, internists, general physicians, or dermatologists) who carried out the skin examination, and, especially, whether only the condition causing symptoms was recorded and thus reflected in the clinical history (most common method in retrospective studies) or whether all participating patients underwent a systematic examination.

The most notable studies carried out in Spain on skin disease in HIV-infected patients during the pre-HAART era are those by García-Muret et al (1988),[11] Febrer (1989),[12] and Muñoz Pérez (1993).[13] The first revealed a prevalence of skin lesions of 60% in seropositive patients.[11] This figure reached 100% in those who were diagnosed with AIDS. Fungal infections, followed by viral and bacterial infections and seborrheic dermatitis, were the most commonly observed conditions in HIV-infected patients who did not have AIDS. The most prevalent diagnoses in patients with AIDS were fungal infections, viral infections, toxicoderma, and seborrheic dermatitis. Febrer[12] found that the overall frequency of skin and mucosal lesions was 76% in hospitalized patients, the most common diagnoses being oral candidiasis, seborrheic eczema, and cutaneous xerosis. Furthermore, a mean of 3 skin diseases was diagnosed per patient, as found in our study. In 1993, Muñoz Pérez[13] analyzed the frequency of skin diseases in HIV-infected patients with relatively preserved immune status (mean CD4+ T-lymphocyte count of 353 cells/mm^3), as we observed in our cases. That author observed a 69% frequency of skin disease, the most common being seborrheic dermatitis, oral candidiasis, cutaneous xerosis, and toxicoderma.

In their retrospective analysis of clinical histories in Italian hospitals in 1996 (pre-HAART) and 1999 (post-HAART), Calista et al[14] found that, in the pre-HAART era, 72% of patients had skin disorders. This proportion fell to 39% after the introduction of HAART, with a mean of 2.1 and 1.6 skin complaints, respectively. The most common disorders in the first period were cutaneous mycosis, oral candidiasis, oral hairy leukoplakia, and seborrheic dermatitis. After the introduction of HAART, common warts, cutaneous mycosis, and toxicoderma were the most frequent diagnoses; cutaneous xerosis was an infrequent finding in the study. The differences observed with respect to our study could be due to underdiagnosis when collecting data from the clinical history and not from direct physical examination.

Almagro et al[15] recorded a 97.6% prevalence of skin disease during 1997-1999 that coincided with the introduction of HAART in Spain. The most common conditions were seborrheic dermatitis, onychopathy, and onychomycosis. However, the most similar study to ours in design and sample type was that of Zancanaro et al,[16] which was performed between 1996 and 2002. The authors analyzed outpatients with a relatively conserved immune status—69.3% were black—and observed a 97.4% frequency of skin disease, the most common diagnosis being folliculitis (both infectious and inflammatory), followed by genital warts and seborrheic dermatitis.

All the above studies revealed a decline in the prevalence of skin conditions traditionally associated with HIV infection and in opportunistic infections such as oral candidiasis. Today, other less severe disorders that were probably already present during the pre-HAART era (eg, cutaneous xerosis, folliculitis, and seborrheic dermatitis) are increasingly important. The phenomenon is typical of all the studies performed in the HAART era, and ours followed this trend.

As for categories of skin disease, infection was clearly the most common manifestation in our study, more so than infections by dermatophytes, onychomycosis, and candidiasis. Infection was followed by inflammatory processes, then xerosis and related disorders. Toxicoderma is uncommon, and was observed in only 4 patients. These findings are consistent with those of Calista et al,[14] who also observed that infection was more common, followed by inflammatory disorders, both during the pre-HAART era of their study and during the HAART era. The authors observed a larger percentage of adverse skin reactions to drugs.

When patients were grouped by CD4+ T lymphocyte count and the frequency of the skin diseases compared, the differences were statistically significant for the following diagnoses: scrotal tongue, mucocutaneous candidiasis, molluscum contagiosum, and acquired melanotic macules. These diseases were more common in patients with CD4+ T-lymphocyte counts less than 200 cells/mm^3. It

Table 6 Skin Diseases Classified According to Antiretroviral Therapy (Yes/No)

Skin Disease[a]	Antiretroviral treatment		*P*[b]
	Yes n=219	No n=84	
Xerosis	83 (37.9%)	31 (36.9%)	NS
Seborrheic dermatosis	66 (30.1%)	28 (33.3%)	NS
Nongenitial viral warts	59 (26.9%)	14 (16.7%)	.06
Distal subungual onychomycosis	55 (25.1%)	25 (29.8%)	NS
Nonungual mycosis	45 (20.5%)	13 (15.5%)	NS
Other nail abnormalities	28 (12.8%)	9 (10.7%)	NS
Saburral tongue	21 (9.6%)	13 (15.4%)	NS
Scrotal tongue	19 (8.6%)	5 (5.9%)	NS
Eczema	17 (7.8%)	9 (10.7%)	NS
Candidiasis	11 (5%)	10 (11.9%)	.03
Bacterial folliculitis	9 (4.1%)	4 (4.7%)	NS
Genital warts	8 (3.6%)	6 (7.1%)	NS
Molluscum contagiosum	7 (3.1%)	5 (5.9%)	NS
Psoriasis	6 (2.7%)	4 (4.7%)	NS
Acquired melanotic macules	5 (2.3%)	1 (1.2%)	NS
Oral hairy leukoplakia	4 (1.8%)	3 (3.5%)	NS
Demodex folliculitis	4 (1.8%)	1 (1.2%)	NS
Herpes simplex	4 (1.8%)	6 (7.1%)	.03
Toxicoderma	3 (1.4%)	1 (1.2%)	NS
Eyelash trichomegaly	3 (1.4%)	0 (0%)	NS
Benign tumors of adipose tissue	3 (1.4%)	1 (1.2%)	NS
Kaposi sarcoma	2 (0.9%)	1 (1.2%)	NS

[a]The table includes the most common diagnoses among the study patients.
[b]Statistical significance was set at a *P* value of .05. Abbreviation: NS, nonsignificant.

is not surprising that candidal infections or molluscum contagiosum were more prevalent in patients with lower T-lymphocyte counts. In addition, scrotal tongue has been reported to be more frequent in immunodepressed patients, specifically kidney recipients[17] and liver recipients.[18] This finding is probably related to the greater frequency of oral candidiasis in these patients. However, the exact pathogenesis of scrotal tongue remains unclear and warrants further investigation. Lastly, we were unable to find reports in the literature that would explain the association between $CD4^+$ T-lymphocyte count and the diagnosis of acquired melanotic macules.

Zancanaro et al[16] performed a similar comparison between patients with $CD4^+$ T-lymphocyte counts greater than and less than 200 cells/mm^3 and found that folliculitis (grouped by subtypes), idiopathic pruritus, nodular pruritus, herpes simplex, molluscum contagiosum, herpes zoster, and traumatic ulcers were more common in patients with $CD4^+$ T-lymphocyte counts lower than 200 cells/mm^3. The differences observed were statistically significant. The differences with our study are due partly to the larger sample size of Zancanaro et al (n=897) and to the fact that we did not group folliculitis as a single category.

Finally, as patients were grouped according to whether or not they received antiretroviral therapy and the frequency of the skin diseases detected were compared, the only statistically significant differences found were for mucocutaneous candidiasis and herpes simplex, both of which were more common among patients who did not receive antiretroviral therapy. These results contrast with those of Zancanaro et al,[16] who, after performing a similar classification, obtained statistically significant differences not only for candidiasis and herpes simplex, but also for folliculitis (grouped by subtype), idiopathic pruritus, nodular pruritus, photosensitivity reactions, alopecia, molluscum contagiosum, toxicoderma, soft fibromas, and herpes zoster. All these diagnoses were more frequent among patients who did not receive antiretroviral therapy, except for toxicoderma, photosensitivity, herpes zoster, molluscum contagiosum, and soft fibromas. Again, the larger sample size of Zancanaro et al[16] could explain the differences observed with respect to our study.

Our study has several limitations. First, its cross-sectional observational design did not allow patients to be followed up over time; therefore some skin diseases may not have been detected. Second, participation was voluntary, and, while no relevant bias was observed for patient characteristics, this could have meant that some conditions went undiagnosed. Third, the study only

analyzed outpatients; consequently, skin diseases among hospitalized patients were not taken into consideration. Finally, the low frequency of some diagnoses did not allow us to establish statistical significance for some of the differences observed.

Skin and mucosal lesions continue to be very common among HIV-infected patients (98.3%), despite the advent of new antiretroviral treatments. A dermatology workup continues to be an essential element of the diagnosis of HIV-infected patients, since many of the skin diseases they present are asymptomatic and could go unnoticed.

Conflict of Interest

The authors declare that they have no conflict of interest.

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