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# Dermatological Manifestations during SARS-CoV-2 (COVID-19) on Phototype VI in Thiès/Senegal (West Africa)

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## Abstract

Introduction: Dermatological manifestations are extremely polymorphic, increasingly reported on Caucasian skin. Few studies have been conducted on phototype VI which justifies our work whose objectives were to study the epidemiological, clinical, evolutionary aspects of dermatological manifestations on phototype VI.

Methods: This was a descriptive retrospective study over a period of 1 year (March 3, 2020-March 3, 2021). Included were all patient records hospitalized for SARS-CoV-2 infection confirmed by Polymerase Chain Reaction (PCR), with acute dermatosis. Chronic dermatoses were not included. The data was collected and analyzed with the Epi info 2000 version 7.2.4.0 software.

Results: Out of the 469 hospitalized patient records, 26 had dermatosis or 5.54%. The average age was 56.57 years (32-80 years). The sex ratio was 1.88. The following history was found: diabetes 38.46 (n=10), high blood pressure 26.92% (n=7), cancer 7.69% (n=2) and retroviral terrain 7.69% (n=2). The following dermatological manifestations were found: Pruritus: 30.76%, urticarial: 11.53%, smudges-papules: 3.84%, vesicles: 7.69%, vaso-occlusive lesions: 7 69%, other inflammatory lesions: 26.92%. The average length of hospitalization was 13.34



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days with extremes of 7 to 22 days. The treatment used was azitromycin and hydroxychloroquine in 100%. Healing was noted in 96.15% with one death or 3.84%.

Conclusion: Skin manifestations during COVID are polymorphic and could potentially reflect a full spectrum of viral interactions with the skin. Large-scale studies would help to elucidate the prognostic factors of these skin manifestations.

## Keywords

Dermatological Events; COVID; Phototype VI; Senegal

## Introduction

Known by the predominance of respiratory signs, dermatological manifestations during COVID 19 have been described in the literature [1]. The latter are extremely polymorphic, increasingly reported on Caucasian skin. Few studies have been conducted on phototype VI which justifies our work whose objectives were to study the epidemiological, clinical, evolutionary aspects of dermatological manifestations on phototype VI.

## Materials and Methods

Type of study: It was a descriptive retrospective study.

Population Study: Population under study was eigtheen and above of phototype VI, hospitalised in the medicine service and infected par COVID-19.

Area of Study: in the medical department of the Thiès Regional Hospital.

Study Period: From March 3, 2020 to March 3, 2021.

Criteria of Inclusion: Included were all records of patients hospitalized for SARS-CoV-2 infection confirmed by Polymerase Chain Reaction (PCR) with acute dermatosis (time to onset <15days).

Criteria of Non-Inclusion: Chronic dermatosis were not included, the parameters studied were age (year) sex, history, associated skin symptoms, location and type of skin manifestations, appearance of skin lesions with systemic symptoms, median duration of lesions (days), laboratory results, treatment strategies, severity and patient outcome.

The data was collected and analyzed with epi info 2000 version 7.2. 4.0. Software.



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## Results

Out of the 469 hospitalized patient records, 26 had dermatosis or 5.54%. The age limit was 56.57 years with extremes of 32 and 80 years. The proportion of males was 65.38% (n=17) with a sex ratio of 1.8 8. The following history was found: diabetes 38.46 (n=10), high blood pressure 26.92% (n=7), cancer 7.69% (n=2), retroviral terrain 7.69% (n=2), cardiomyopathy 3.84 (n=1) and cosmetic depigmentation 3.84 (n=1).

The average onset time was the first 4 days. The dermatological manifestations were distributed as follows (Table 1): pruritus was noted in 30.76% followed by urticarial lesions 11.53%, pseudo varicella vesicular lesions 7.69% (Fig. 1), vaso-occlusive lesions 7.69% with a blue toe (Fig. 2). The other inflammatory lesions accounted for 26.92%. The average length of hospitalization was 13.34 days with extremes of 7 to 22 days.

All patients tested positive for COVID by PCR and had frosted glass lung images on chest CT scans.

Azithromycin and hydroxychloroquine were prescribed in 100% of cases. The evolution was marked by the healing of dermatological lesions and COVID in 25 patients (96.15%) and one case of death (3.84%) of a woman, type 2 diabetic who had inflammation of the nipples.

| **Dermatological manifestations** | **Effectives (N)** | **Percentage (%)** | **Time to onset (Days)** |
|---|---|---|---|
| **Pruritus and urticarial lesions** | | | |
| Skin pruritus | 6 | 23,07 | 2 |
| Ocular pruritus | 2 | 7,69 | 2 |
| Acute urticaria | 3 | 11,53 | 3 |
| **Macules and papules** | | | |
| Generalized maculopapular exanthema | 1 | 3,84 | 2 |
| **Vesicles** | | | |
| Pseudo-varicella lesions | 1 | 3,84 | 4 |
| Herpes | 1 | 3,84 | 4 |

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| | | | |
|---|---|---|---|
| **Vaso-occlusive lesions** | | | |
| Blue toe | 1 | 3,84 | 6 |
| Blue lip | 1 | 3,84 | 5 |
| **Other inflammatory lesions** | | | |
| Conjunctival hyperemia | 2 | 7,69 | 2 |
| Oral enanthema | 1 | 3,84 | 4 |
| Angular cheilite | 1 | 3,84 | 5 |
| Inflammation nipples | 2 | 7,69 | 7 |
| Impetigo nostrils | 1 | 3,84 | 12 |

**Table 1:** Distribution of dermatological manifestations according to time to onset and D dimers.

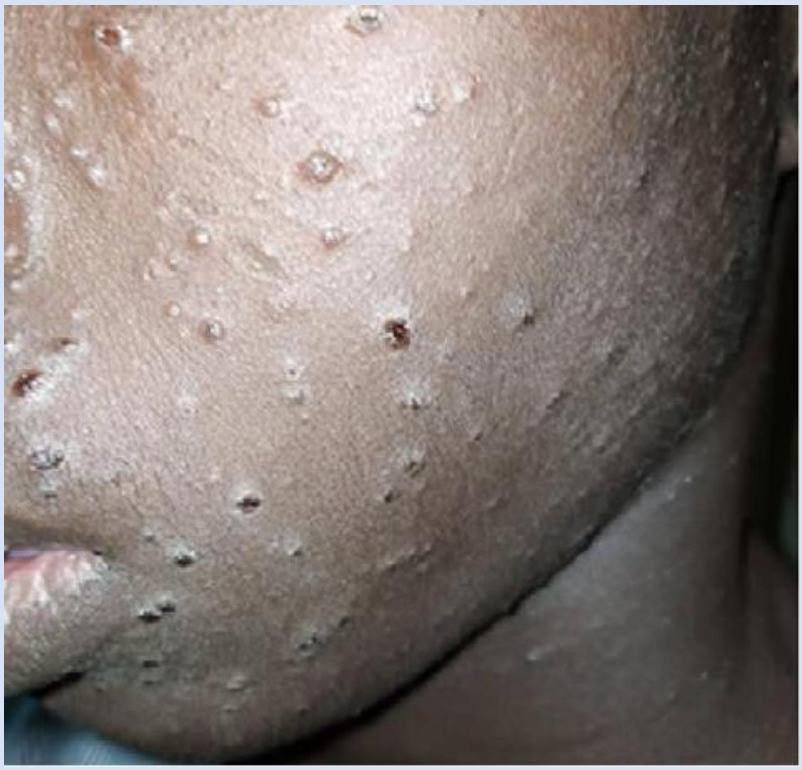

**Figure 1:** Pseudo varicella rash of the face.

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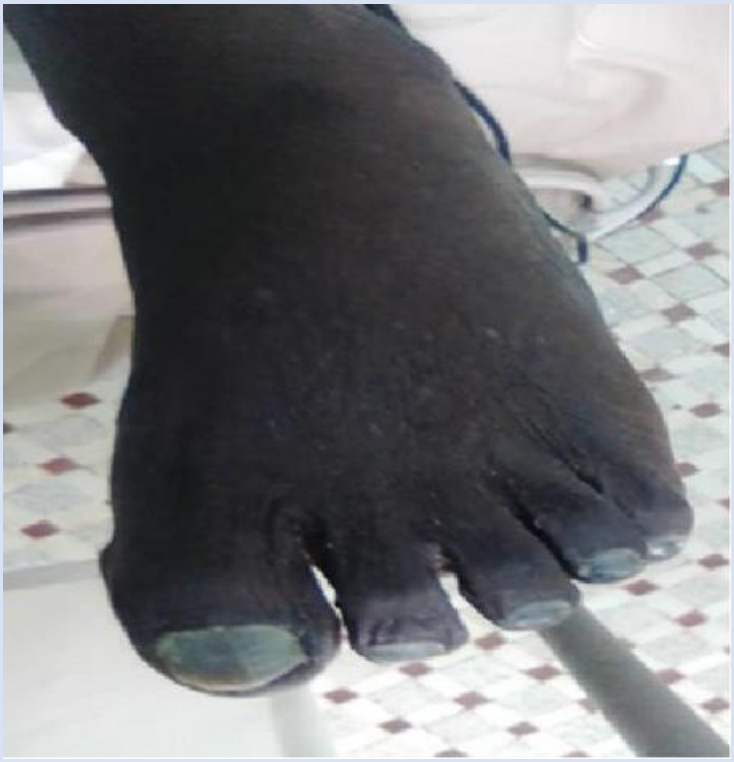

**Figure 2:** Blue toe on phototype VI.

## Discussion

The limitations of the study were the retrospective nature and duration of the study.

The recognition of dermatoses linked to COVID-19 can help in the early diagnosis of the disease.

Epidemiologically, the prevalence of skin manifestations related to COVID-19 differed according to the studies, by 5.54% in our series, it was 0.2% in China, 7.25% in India and 20.4% in Italy [1-3]. This difference would probably be related to selection bias. The mean age in our series (56.57 years) was higher than the median age of patients in the Parnian, et al., study (41.9 years). In this study, more than half of the affected patients were women [4].

The appearance of dermatological manifestations could be linked to an invasion of keratinocytes and sweat gland cells by viruses, this process mediated by the Angiotensin-Converting Enzyme 2 (ACE2) on the cells [5-7].

Among the latter, pruritus was the first skin manifestation in our series and has it more common in COVID-19 patients in the literature [4,8]. One of the hypotheses on the pathogenesis of urticaria in COVID-19 was virus-induced mast cell degranulation, whereby SARS-CoV-2



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enters vascular cells via ACE2. The deposition of antigen-antibody complexes leads to complement activation, mast cell degranulation and bradykinin release [8]. This is supported by the demonstration of co-localization of SARS-CoV-2 glycoproteins with complement components in cutaneous blood [3]. However, Pathania, et al., reported that emotional stress related to COVID-19 might trigger urticaria rather than the infection itself [5]. Hassan, et al., described a patient with a history of atopic dermatitis who presented with urticaria as the first dermatological manifestation of COVID-19 [6].

Apart from pruritus and urticarial lesions, we had a case of blue toe and a case of blue lip in our series. Vaso-occlusive lesions were linked to significantly high levels of D-dimers and disseminated intravascular coagulation. Activation of the complement system leads to systematic microvascular lesions [9]. The latter manifested by vaso-occlusive lesions could be a potential marker of severe COVID-19 infection [10]. Also, Lipoprotein A (LpA) plays a major role in thrombo-occlusive vasculopathy [11]. There is genetic variability in LpA levels between ethnic populations. Studies have consistently shown that black individuals have LpA levels 2 to 3 times higher than white individuals [12]. The prevalence of factor V Leiden mutations may also play a role. It differs according to ethnic groups with 2.21% among Latinos, 1.25% among Americans, 1.23% among Africans and 0.45% among Asians [12,13].

Rashes containing macules and papules were the second most common skin manifestation of COVID-19 according to Pangti R, et al., [2]. About 55.8% of rashes containing macules and papules occurred during the active phase of the disease as in our series, which may correspond to the viremia phase [2]. Young and Fernandez described the histopathology of apoptotic keratinocytes in the epidermis [14]. During the viraemic phase, the virus spreads hematogenously, including to the endothelium of skin vessels. The infected endothelial cells then attract cytotoxic T-cells, this whole process leading to apoptosis of the keratinocytes responsible for the occurrence of these dermatological lesions [2,14].

SARS-CoV-2 could trigger the reactivation of other viruses, explaining the increase in the occurrence of certain viral dermatosis [15].

Compared to pseudo-frostbite, there is an inter-ethnic divergence in the prevalence of pseudo-frostbite lesions. A multicenter case series by Freeman EE, et al., included a total of 318 patients with pseudo-frostbite; 89% of patients were white and only 0.7% were black or African American [16]. Individuals with the minor allele T have increased production of interferon. The African-American population with low allelic frequency of SNP rs1990760 (T-allele) in IFIH1 predicts less IFN-beta expression and potential vulnerability to COVID-19 infection [17,18]. The frequency of minor alleles (Tmaf) is more common in white populations compared to Chinese and African populations [18]. This could explain why pseudo-frostbite was more frequently seen in white populations compared to other breeds. However, another possible explanation would be the under-reporting of skin manifestations in dark-skinned populations.



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Comorbidities were noted in 17.9% of cases, hypertension (39%), diabetes (23%). Diabetes was frequently seen in patients with hives-like lesions (46%) [4]. Hydroxychloroquine was the most used drug in the literature (45%) and in our series [4]. Compared to complications, patients with vaso-occlusive lesions had a higher risk of severe pneumonia requiring intensive care, which was associated with higher mortality rates [15]. In the literature, the mortality of COVID-19 patients with cutaneous manifestations was 4.5% [4]. It was 18.2% in case of vascular lesions and (2.2%) in case of urticaria [4].

## Conclusion

The scientific understanding of dermatoses on COVID-19 is still evolving. Polymorphic skin manifestations in patients infected with COVID-19 could potentially reflect a set of disturbances within the skin, characterized by direct viral action in infected cells, immune system hyperactivity and hypercoagulability. Future studies with better scientific literature would help elucidate the pathophysiological characteristics and prognostic factors of these dermatoses on COVID-19.

## Conflict of Interest

The authors declare that they have no conflict of interest.

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