









ORIGINAL ARTICLE

Maculopapular eruptions associated to COVID-19: A subanalysis of the COVID-Piel study

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Abstract

A previous study has defined the maculopapular subtype of manifestations of COVID-19. The objective of our study was to describe and classify maculopapular eruptions associated with COVID-19. We carried out a subanalysis of the maculopapular cases found in the previous cross-sectional study. Using a consensus, we defined seven clinical patterns. We described patient demographics, the therapy received by the patient and the characteristics of each pattern. Consensus led to the description of seven major maculopapular patterns: morbilliform (45.5%), other maculopapular (20.0%), purpuric (14.2%), erythema multiforme-like (9.7%), pityriasis rosea-like (5.7%), erythema elevatum diutinum-like (2.3%), and perifollicular (2.3%). In most cases, maculopapular eruptions were coincident (61.9%) or subsequent (34.1%) to the onset of other COVID-19 manifestations. The most frequent were cough (76%), dyspnea (72%), fever (88%), and asthenia (62%). Hospital admission due to pneumonia was frequent (61%). Drug intake was frequent (78%). Laboratory alterations associated with maculo-papular eruptions were high C-reactive protein, high D-Dimer, lymphopenia, high ferritin, high LDH, and high IL-6. The main limitation of our study was the impossibility to define the cause-effect relationship of each pattern. In conclusion, we provide a description of the cutaneous maculopapular manifestations associated with COVID-19. The cutaneous manifestations of COVID-19 are wide-ranging and can mimic other dermatoses.

KEYWORDS

coronavirus, COVID-19, cutaneous manifestations, skin

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1 | INTRODUCTION

Coronavirus disease (COVID-19) can affect different organs, including the skin.¹⁻³ We have described the first classification of skin manifestations of COVID-19,⁴ which consists of five patterns: pseudo-chilblain, vesicular eruptions, urticarial lesions, maculopapular eruptions, and livedo or necrosis. The maculopapular pattern was the most polymorphic and present in patients who received many drugs for the treatment of COVID-19.

The objective of this study was to describe the subtypes of maculopapular eruptions, to facilitate their recognition, and to describe their distinctive characteristics.

2 | MATERIALS AND METHODS

We conducted a subanalysis of a previously published cross-sectional study,⁴ describing cases that had been classified within a maculopapular pattern. Methods have been described in the previous publication. Briefly, with the help of the Spanish Academy of Dermatology, we asked all Spanish dermatologists to include patients in this study for 2 weeks. A standardized questionnaire was used, and pictures were taken for most of them.

The questionnaire included demographic data (sex, age, medical history), characteristics of the rash (description, evolution, symptoms, and days of the skin eruption from onset to end) and characteristics of SARS-CoV-2 infection (COVID-19 symptoms, diagnostic test, diagnosis of pneumonia, need for admission, drugs at onset of the rash, analytical abnormalities, and patient survival).

We included all patients with an eruption of recent onset (previous 2 weeks) and no clear explanation, who had a confirmed (laboratory confirmation) or suspected (according to the European Center for Disease Control clinical diagnostic criteria at that time) diagnosis of COVID-19. Because this is a multicenter study, four patients have been previously reported.⁵⁻⁷

Photographs were independently reviewed by a group of three dermatologists who were blinded to the rest of the clinical information, and a consensus was reached on the maculopapular patterns.

The study was authorized by an ethics committee (HUGCDN: 2020-172-1- COVID-19). All patients, or their tutors or next of kin in

case of minors, gave their informed consent to participate in the study and an explicit consent to use their pictures in publications.

Data analysis consisted of descriptions and was performed using Stata 16 (Statacorp, 2019).

3 | RESULTS

From the initial 375 cutaneous cases, we sorted 176 cases of maculopapular eruptions from the 3rd to the 16th of April 2020, during the peak of the epidemic in Spain.

The consensus, following image review, led to the description of seven maculopapular patterns (Table 1): (a) morbilliform, (b) other maculopapular, (c) purpuric, (d) erythema multiforme-like, (e) pityriasis rosea-like, (f) erythema elevatum diutinum-like, and (g) perifollicular.

In most cases, maculopapular eruptions were coincident (61.9%) with or subsequent (34.1%) to the onset of other COVID-19 systemic manifestations, including fever (88%), cough (76%), dyspnoea (72%), asthenia (62%), nausea/vomiting/diarrhea (30%), headache (29%), and anosmia/ageusia (23%).

3.1 | Morbilliform eruptions

Morbilliform eruptions represented the most frequent maculopapular pattern ($N = 80$, 45.5%). The mean age of the patients was 61.1 years, with similar affectation by sex (48.8% male).

These eruptions were characterized by erythematous macules with islands of normal-appearing skin (Figure 1), described as generalized (80%), symmetrical (55%), and confluent (54%), in most cases starting in the trunk (79%) with centrifugal progression (66%). Of these, 72.5% were symptomatic and the main symptom was itching (93.1%). Few cases ($N = 2$) reported intraoral lesions and small red spots on the soft palate, although oral examination was not mandatory in our study. The mean duration of the rash was 7.2 (± 4.3) days.

3.2 | Other maculopapular eruptions

These accounted for the second group in frequency ($N = 36$, 20%). The mean age was 50.3 years, with a slight predominance in females

TABLE 1 Characteristics of the patients, COVID-19, therapy, and prognosis factors of each pattern

	Morbilliform eruptions	Other maculo-papular	Purpuric eruptions	Erythema multiforme-like	Pythiasis rosea-like	Erythema elevatum diutinum-like	Perifollicular eruption
N	80	36	25	17	10	4	4
Age mean (SD)	61.1 (18.3)	50.3 (17.8)	54.6 (23.4)	61.5 (13.2)	36.0 (19.7)	32.5 (15.0)	35.0 (25.8)
Duration of cutaneous disease (days) mean (SD)	7.2 (4.3)	11.8 (11.8)	7.4 (4.5)	9.7 (4.9)	12.1 (4.5)	6.0 (4.1)	4.5 (1.0)
Gender							
Male N (%)	39 (48.8)	12 (33.3)	15 (60.0)	2 (11.8)	6 (60.0)	1 (25.0)	3 (75.0)
Female N (%)	41 (51.3)	24 (66.7)	10 (40.0)	15 (88.2)	4 (40.0)	3 (75.0)	1 (25.0)
Smoking N (%)	13 (20.6)	2 (6.7)	5 (21.7)	0 (0.0)	0 (0.0)	0 (0.0)	1 (33.3)
Other COVID-19 symptoms							
Cough N (%)	65 (81.3)	27 (75.0)	20 (80.0)	10 (58.8)	6 (60.0)	4 (100)	3 (75.0)
Dyspnea N (%)	53 (66.3)	15 (41.7)	15 (60.0)	13 (76.5)	2 (20.0)	0 (0.0)	2 (50.0)
Fever N (%)	74 (92.5)	27 (75.0)	20 (80.0)	12 (70.6)	4 (40.0)	1 (25.0)	2 (50.0)
Asthenia N (%)	52 (65.0)	28 (77.8)	11 (44.0)	10 (58.8)	5 (50.0)	1 (25.0)	3 (75.0)
Headache N (%)	24 (30.0)	15 (41.7)	7 (28.0)	2 (11.8)	5 (50.0)	1 (25.0)	1 (25.0)
Nausea/vomiting/ diarrhea N (%)	27 (33.8)	13 (36.1)	7 (28.0)	7 (41.2)	2 (20.0)	1 (25.0)	1 (25.0)
Anosmia/ageusia N (%)	11 (13.8)	14 (38.9)	8 (32.0)	4 (23.5)	2 (20.0)	0 (0.0)	1 (25.0)
Pneumonia N (%)	63 (78.8)	16 (44.4)	15 (60.0)	12 (70.6)	2 (20.0)	0 (0.0)	2 (50.0)
Hospital admission N (%)	64 (80.0)	12 (33.3)	14 (56.0)	13 (76.5)	2 (20.0)	0 (0.0)	2 (50.0)
Intensive care unit or non-invasive mechanical ventilation N (%)	15 (18.8)	1 (2.8)	2 (8.0)	2 (11.8)	1 (10.0)	0 (0.0)	0 (0.0)
Cutaneous symptoms (simultaneity)							
Skin previous N (%)	2 (2.5)	3 (8.3)	2 (8.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (25.0)
Same time N (%)	44 (55.0)	27 (75.0)	17 (68.0)	10 (58.8)	6 (60.0)	1 (25.0)	3 (75.0)
Skin after N (%)	34 (42.5)	6 (16.7)	6 (24.0)	7 (41.2)	4 (40.0)	3 (75.0)	0 (0.0)
COVID-19 case							
Suspected case N (%)	14 (17.5)	15 (41.7)	7 (28.0)	6 (35.3)	7 (70.0)	4 (100)	1 (25.0)
Confirmed case N (%)	66 (82.5)	21 (58.3)	18 (72.0)	11 (64.7)	3 (30.0)	0 (0.0)	3 (75.0)

(Continues)

TABLE 1 (Continued)

	Morbilliform eruptions	Other maculo-papular	Purpuric eruptions	Erythema multiforme-like	Pytiasis rosea-like	Erythema elevatum diutinum-like	Perifollicular eruption
Presence of cutaneous symptoms N (%)	58 (72.5)	23 (63.9)	11 (44.0)	11 (64.7)	5 (50.0)	3 (75.0)	1 (25.0)
Pain N (%)	2 (3.5)	1 (4.4)	1 (9.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Burning N (%)	2 (3.5)	3 (13.0)	0 (0.0)	3 (27.3)	0 (0.0)	1 (33.3)	0 (0.0)
Itch N (%)	54 (93.1)	19 (82.6)	10 (90.9)	8 (72.7)	5 (100)	2 (66.7)	1 (100)
Receiving treatment for COVID-19 N (%)	65 (81.3)	29 (80.6)	21 (84.0)	13 (76.5)	7 (70.0)	1 (25.0)	2 (50.0)
Chloroquine/ hydroxychloroquine N (%)	45 (56.3)	11 (30.6)	13 (52.0)	8 (47.1)	1 (10.0)	0 (0)	1 (25.0)
Lopinavir/ritonavir N (%)	32 (40.0)	7 (19.4)	7 (28.0)	8 (47.1)	1 (10.0)	0 (0.0)	0 (0.0)
Azithromycin N (%)	21 (26.3)	9 (25.0)	4 (16.0)	6 (35.3)	0 (0.0)	0 (0.0)	0 (0.0)
Systemic corticosteroids N (%)	16 (20.0)	2 (5.6)	1 (4.0)	2 (11.8)	1 (10.0)	0 (0.0)	0 (0.0)
Tocilizumab N (%)	8 (10.0)	1 (2.8)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Other treatment N	NSAIDs, 8 B1-Interferon, 5 Amoxicillin, 1 Levofloxacin, 1 Vancomycin, 1 Piperacillin- Tazobactam, 1	NSAIDs, 1 Anakinra, 1 Ceftriaxone, 2 Piperacillin- tazobactam, 1	NSAIDs, 2 B1- Interferon, 1 Ceftriaxone, 2	Metoclopramide, 1 Amoxicillin, 1 Ivermectin, 1 Ceftriaxone, 1 Piperacillin- tazobactam, 1	NSAIDs, 2 (20)	NSAIDs, 1	-
Patient survival N (%)	77 (96.3)	36 (100)	24 (96.0)	17 (100)	10 (100)	4 (100)	4 (100)

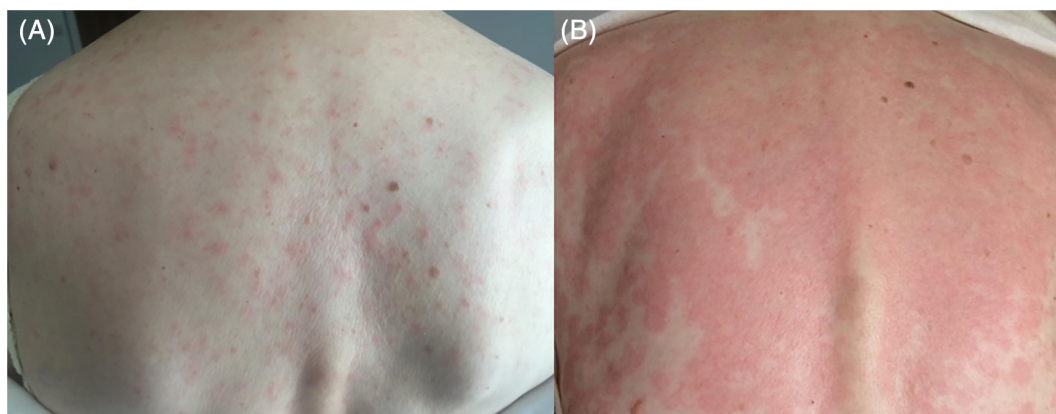


FIGURE 1 Morbilliform eruption (A) back and (B) back after 3 days. A 90-year-old woman with a morbilliform rash, affecting the trunk, coinciding with cough, dyspnoea, fever, diarrhea, and anosmia. The eruption appeared days after the start of the COVID-19 symptoms. She required treatment with hydroxychloroquine, azithromycin, and paracetamol

(66.7%). Of the patients, 63.9% were symptomatic and the main symptom was itching (82.6%). The mean duration of the rash was 11.8 (\pm 11.8) days.

The rash was described as generalized (70%), symmetrical (55%), in most cases starting in the trunk and/or the limbs (81%). This pattern was characterized by the presence of erythematous macules or papules, occasionally scaly (Figure 2), which did not follow a morphology or distribution that allowed their inclusion in other patterns.



FIGURE 2 Other maculopapular eruptions. A 44-year-old woman with an erythematous maculopapular rash affecting the trunk and upper limbs. The rash preceded the onset of other COVID-19 symptoms (myalgia, anosmia, low-grade fever, and odynophagia). PCR for SARS-CoV-2 was positive. She did not require hospital admission or receive treatment other than paracetamol

3.3 | Purpuric eruptions

They represented the third group in frequency ($N = 25$, 14.2%). The mean age was 54.6 years, with a slight predominance in males (60%).

These eruptions were characterized by erythematous purpuric macules and/or papules (Figure 3). The rash was either generalized (44%), localized (40%), symmetrical (56%), non-confluent (24%), and in some cases perifollicular (16%).

The eruption started either on the trunk (32%), upper limbs (32%), lower limbs (12%), and axillary and/or inguinal folds (20%). One case presented with pinpoint oral mucosa involvement (4%). The mean duration was 7.4 (\pm 4.5) days. The rash was symptomatic in 44% of the cases, and the main symptom was itching (100%).

3.4 | Erythema multiforme-like eruptions

Erythema multiforme-like eruptions were observed in 17 (9.7%) patients. The mean age of the patients was 61.5 years, with female predominance (88.2%).

These eruptions were characterized by erythematous-violaceous maculopapules, which progressively transformed into patches with a dark center, and targetoid lesions were sometimes observed (Figure 4). The rash was generalized (70.6%), symmetrical (47.1%), confluent (41.2%), and/or palmoplantar (11.8%). The eruption started on the trunk and upper limbs in 70.6% and 23.5% of cases, respectively. The mean duration was 9.7 (\pm 4.9) days. Most rashes were symptomatic (64.7%) and itching (72.7%) or burning sensation (27.3%) were the main symptoms.

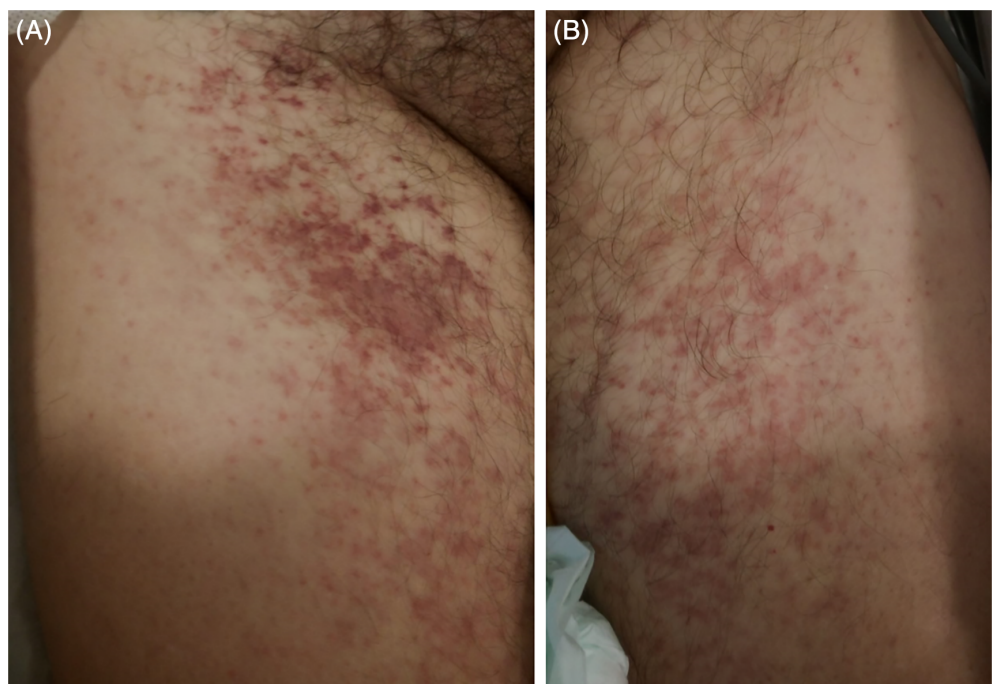


FIGURE 3 Purpuric eruption. (A) Right leg and (B) left leg. A 63-year-old man with a purpuric eruption affecting the inguinal folds. It started at the same time as other COVID-19 symptoms (cough, dyspnoea, fever, headache, diarrhea, and malaise). The diagnosis was confirmed by PCR, and the patient required admission to the ICU for pneumonia. He was treated with hydroxychloroquine, lopinavir/ritonavir, systemic corticosteroids, and interferon

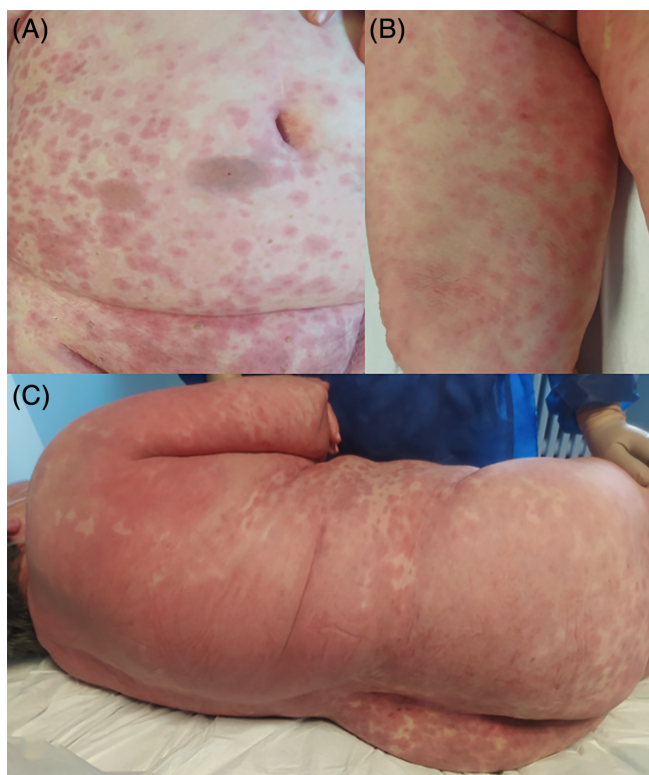


FIGURE 4 Erythema multiforme-like eruption. (A) Abdomen, (B) right leg, and (C) back. An 84-year-old woman with a generalized, targetoid maculopapular, and confluent rash. This coincided with cough, dyspnoea, fever, and nausea. The diagnosis was confirmed by PCR and the patient required hospital admission. The only treatment she had received before the onset of the eruption was metoclopramide

3.5 | Pityriasis rosea-like eruptions

This eruption appeared in 5.7% of cases ($N = 10$). The mean age was $36.0 (\pm 19.7)$ years, with a slight predominance in males (60%).

It was characterized by erythematous brownish and sometimes scaly annular patches all over the trunk. In up to 30% of cases, the generalized rash was preceded by a larger patch. The rash was described as generalized (60%) and non-confluent (70%). Primary lesions appeared on the trunk (90%). The mean duration was $12.1 (\pm 4.5)$ days. Half of the patients described the rash as symptomatic and the symptom was itching (100%).

3.6 | Erythema elevatum diutinum-like eruptions

Four cases (2.3%) of erythema elevatum diutinum-like pattern were observed, characterized by infiltrated pink erythematous papules on the limbs, mostly on the dorsum of the hands (75%), resembling erythema elevatum diutinum (Figure 5). The mean eruption duration was $6.0 (\pm 4.1)$ days. Most patients described the rash as symptomatic (75%), including itching (66.7%) or burning sensation (33.3%).



FIGURE 5 Erythema elevatum diutinum-like eruption. A 43-year-old woman with erythematous papules on the back of her left hand. Although the patient had no confirmed diagnosis of COVID-19 at the time of the study, it was later confirmed by PCR. The eruption coincided with fever, myalgia, diarrhea, cough, and headache. She did not require hospital admission. The only drugs she took before the onset of the eruption was paracetamol and ibuprofen

3.7 | Perifollicular eruptions

These eruptions were also infrequent ($N = 4$, 2.3%). These were characterized by small 2-3 mm erythematous, brownish perifollicular papules (Figure 6) that occasionally converged to form larger areas. Dermatologists mostly described the rash as localized (75%), symmetrical (75%), and confluent (75%).

Primary lesions appeared in the trunk (100%). The mean duration of the perifollicular eruption was $4.5 (\pm 1)$ days, and 75% were asymptomatic.

3.8 | Maculopapular patterns, pneumonia diagnosis, and hospital admission

Hospital admission due to pneumonia was very frequent in morbilliform (80%) and erythema multiforme-like (76.5%) patterns, requiring non-invasive mechanical ventilation or intensive care unit (ICU) admission in 18.8% and 11.8%, respectively. Approximately half of the other maculopapular cases required hospital admission due to pneumonia (44.4%), and few cases required ICU admission (2.8%).

Due to the low number of cases in the other groups, we could not make meaningful comparisons.

3.9 | Maculopapular patterns and prescribed concomitant drugs for COVID-19

Drug intake was frequent in purpuric, morbilliform, other maculopapular, and erythema multiforme-like eruptions (84%, 81.3%,



FIGURE 6 Perifollicular eruptions. A 25-year-old man with a perifollicular erythematous rash associated with anosmia and myalgia. The diagnosis of COVID-19 was confirmed by PCR. He did not require hospital admission or treatment other than paracetamol

80.6%, and 76.5%, respectively). The most frequent drug was chloroquine/hydroxychloroquine (52%, 56.3%, 30.6%, and 47.1%, respectively), followed by lopinavir/ritonavir (28%, 40%, 19.4%, and 47.1%, respectively), and azithromycin (16%, 26.3%, 25%, and 35.3%, respectively). Only 10% of the morbilliform cases and 2.8% of the other maculopapular cases received tocilizumab. One purpuric case received systemic corticosteroids. Four other maculopapular cases received antibiotics other than azithromycin (one piperacillin/tazobactam, one amoxicillin, and two ceftriaxone).

Only four pityriasis rosea-like cases and one perifollicular case received treatment for COVID-19 other than acetaminophen at the time of eruption onset (chloroquine/hydroxychloroquine, NSAIDs, or lopinavir/ritonavir). No erythema elevatum diutinum-like cases received treatment for COVID-19 other than acetaminophen at eruption onset.

3.10 | Maculopapular patterns and laboratory abnormalities

Laboratory abnormalities associated with COVID-19 were frequent in morbilliform, purpuric, erythema multiforme-like, and perifollicular eruptions. The most frequent abnormalities were high C-reactive

protein (68.8%, 64%, 76.5%, and 75%, respectively), high D-dimer (63.8%, 60%, 64.7%, and 50%, respectively), lymphopenia (56.3%, 32%, 52.9%, and 25%, respectively), high ferritin (46.3%, 32%, 35.3%, and 50%, respectively), high LDH (56.3%, 60%, 70.6%, and 50%, respectively), and high IL-6 (7.5%, 4%, 11.8%, and 0%, respectively).

In contrast, these alterations were less frequent among pityriasis rosea-like and other maculopapular eruptions. No laboratory abnormalities were detected in erythema elevatum diutinum-like eruption.

4 | DISCUSSION

We described seven maculopapular sub-patterns associated with COVID-19. The description of their clinical characteristics makes them easily recognizable. Given these findings, COVID-19 could be included as a differential diagnosis in patients presenting with these cutaneous manifestations. Previous publications have described some of these patterns but are based on very few cases, and no temporal relationship with other COVID-19 symptoms were analyzed. There were no differences between the sub-patterns as concerns the onset of the eruption or association with severity.

COVID-19 associated morbilliform viral eruptions have been reported.⁸⁻¹² As in our series, they usually presented with other concomitant COVID-19 symptoms at the time of eruption onset, mainly fever, myalgia, asthenia, and cough. Many cases were diagnosed with pneumonia and/or required hospital admission, and the morbilliform eruption improved as well as the other COVID-19 symptoms.

The possible causes of morbilliform rash include an immune response to the virus or an adverse drug reaction. In favor of the immune response hypothesis, the rash usually coincides with episodes of fever or other symptoms of COVID-19. When a biopsy is performed, mild spongiosis, basal cell vacuolation, and mild perivascular lymphocytic infiltrates are observed, as in other virus-induced lesions.⁸

Morbilliform rashes can also be associated with adverse drug reactions. Hydroxychloroquine, chloroquine, azithromycin, lopinavir/ritonavir, and tocilizumab have been reported to cause morbilliform eruptions.¹³ Although many patients in our series received these drugs, many of the morbilliform eruptions started at the time as other COVID-19 symptoms, making it unlikely that all of them were of pharmacological origin.

Other maculopapular eruptions have been associated with COVID-19 symptoms in our series and in previously described cases.^{14,15} When biopsied,¹⁵ a histopathological study revealed superficial perivascular dermatitis with mild spongiosis and small thrombus in the mid dermis. Other publications^{16,17} showed perivascular lymphocytic infiltrates, with vacuolar degeneration of the interface without thrombosis. In our study, some eruptions were generalized and non-confluent, while others were localized (palmar or plantar erythema). When evaluating a maculopapular rash of unknown origin, and in the appropriate epidemiological context, COVID-19 should be considered in the differential diagnosis, especially if the histopathological findings are compatible.

The first case of skin manifestation of COVID-19 was described in Thailand as a purpuric rash, that was mistaken for dengue fever.¹⁸ Other cases of purpuric or petechial rashes associated with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) have been described.^{5,19-21} As in our patients, the eruption usually affects the upper limbs or the trunk; it is asymptomatic and coincides with other COVID-19 symptoms. Flexural involvement has been described as similar to symmetrical drug-related intertriginous and flexural exanthema (SDRIFE).²¹ However, in cases of purpuric rashes associated with SARS-CoV-2, drug intake has not been consistent. Therefore, as with parvovirus B19,²² the affinity of SARS-CoV-2 for the endothelium may explain these purpuric eruptions.²³

One of the published cases of purpura associated with COVID-19²⁰ was diagnosed with autoimmune thrombocytopenic purpura. It might be important to perform a complete blood count and coagulation tests in patients with purpuric manifestations.

Other cases of erythema multiforme-like lesions associated with SARS-CoV-2 have also been described in children²⁴ and adults,⁶ with an acral,^{25,26} or generalized⁶ distribution. When biopsy was performed,^{6,25} moderate exocytosis, vacuolar changes, and spongiosis, without necrotic keratinocytes were observed. Superficial and deep perivascular inflammation and vascular ectasia were frequent. Several factors have been suggested to be associated with the development of erythema multiforme, such as infections, drugs, autoimmune diseases, malignancy, immunization, radiation, and menstruation.²⁷ Herpes simplex virus and *Mycoplasma pneumoniae* are the main agents, but other viruses have been reported, such as adenovirus, cytomegalovirus, Coxsackie, and Parvovirus B19.⁶ Erythema multiforme-like cases associated with chloroquine have also been described.²⁸ In this study, 47% of patients received hydroxychloroquine, which may be a contributing factor. However, histopathological findings^{6,25} suggest that viral infections may play an important pathophysiological role.

We described 10 cases of pityriasis rosea-like lesions associated with COVID-19, affecting the trunk. Patients were younger than in the other sub-patterns, frequently asymptomatic. In our study, the patient rarely required hospital admission. Two cases had been previously described.^{29,30} One of them in our opinion does not really fit the pityriasis rosea diagnosis.³⁰ The other one²⁹ is quite like the ones described in our study.

Finally, we described some perifollicular and erythema elevatum diutinum-like eruptions, coinciding with other COVID-19 symptoms. Some of these, were just suspected COVID-19 cases, so the relationship with SARS-CoV-2 infection can not be properly stated. However, other cases have been published,^{15,31-34} and we have seen other COVID-19 cases with cutaneous manifestations resembling erythema elevatum diutinum, with histopathological study confirming lymphocytic vasculitis in the biopsy (unpublished data). As a consequence, cutaneous vasculitis should also be considered as a manifestation of SARS-COV-2 infection during the pandemic.

The main drawback of our study is the impossibility to define the cause-effect relationship of each pattern. All patterns are similar to

other dermatological diseases, some of which are caused by medications or infectious agents. In addition, our follow-up was short; therefore, the data are limited in reference to long-term survival or chronology.

5 | CONCLUSIONS

We provide a description of the cutaneous maculopapular manifestations associated with COVID-19. The cutaneous manifestations of COVID-19 vary and can mimic other dermatological diseases.

Although maculopapular eruptions are not specific to COVID-19, these rashes are related to the disease. COVID-19 should be included in the differential diagnosis when the epidemiological context supports it.

The suspicion of COVID-19 as a possible diagnosis led us to rule out the presence of pneumonia and laboratory abnormalities, since we verified that many patients in our series and in previous publications³⁴ with these eruptions showed alterations in the complementary tests.

In patients with confirmed diagnosis of COVID-19 with prescribed treatment, it is important to assess whether the latter may be the cause of the rash.

Skin biopsies for histopathological studies could improve our knowledge and resolve existing doubts. Further research describing clinicopathologic correlation is mandatory.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

Data supporting the findings of this study are available upon request from the corresponding author. The data supporting the findings of this study are available in the records of the Research Unit - Piel Sana (Academia Española de Dermatología y Venereología). The data are not publicly available due to privacy or ethical restrictions.

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