Original Article

Dermatological Manifestations of COVID-19: Data from a tertiary care hospital of Pakistan dedicated for COVID-19 Patients

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Abstract

Objective: To describe the cutaneous manifestations of COVID-19 disease in patients presenting to a tertiary care hospital in Pakistan

Materials and Methods: This descriptive study was carried out at Benazir Bhutto Hospital, Rawalpindi Medical University, Rawalpindi from March 2020 till December 2020. A total of 150 patients were screened by senior dermatology postgraduate trainees who were deployed for the care of COVID-19 patients. The demographics, rash if any along with its complete history and description, and laboratory investigations were noted on a preformed proforma. The pictures of the rash were taken after verbal consent of the patient or surrogate. The pictures were then discussed with the consultant for appropriate categorization.

Results: A total of 150 patients with the diagnosis of COVID-19 were screened. The mean age of the subjects was 51.9 ± 17.2 years. There were 94 (62.7%) males and 56 (37.3%) females. The mean duration of illness at the time of screening was 12.5 ± 9.7 days. Only 7 (4.7%) COVID-19 patients showed skin lesions. These included generalized bullous pemphigoid-like (1 patient), urticarial lesions (1 patient), vesicular eruption (1 patient), skin necrosis (1 patient), and maculopapular rash (3 patients). The average duration of illness at the time of dermatological manifestation of COVID-19 was 6.31 ± 2.3 days.

Conclusion: The skin manifestations of COVID-19 patients in our centre in Pakistan are less as compared to reports and data from the western world. However, they are in accordance with the data reported from few Asian countries. Regardless of this, the type, distribution, and association of skin lesions with COVID-19 appear to be universal. This difference in frequency can be attributed to the racial differences or the variety of COVID-19 viral strains predominant in different countries. However, further studies are required to prove this association.

Keywords: COVID-19, Dermatology, Skin Manifestations, Cutaneous Manifestations.

Introduction

In December 2019, the first cases of pneumonia with unknown causes were reported in Wuhan, China.[1] The new pathogen, called SARS-CoV-2, was isolated from samples of the lower respiratory tract of infected patients, and the resulting disease was called COVID-19 (Coronavirus Disease 2019).[2] SARS-CoV-2 has rapidly spread reaching the level of a pandemic disease.

COVID-19 can affect different organ systems, probably including the skin. There is a wide variety of descriptions of the cutaneous manifestations of COVID-19. Twenty percent of patients in an Italian medical ward were found to be having cutaneous lesions,[3] which prompted researchers to look into this interesting association. So, authors from a recent Italian study have identified 6 main phenotypes: (1) urticarial rash, (2) confluent erythematous/maculopapular/morbilliform rash, (3) papulovesicular exanthem, (4) a chilblain-like acral pattern, (5) a livedo reticularis/racemosa-like pattern, and (6) a purpuric vasculitic pattern. However, there have been reports of other skin manifestations outside this classification, including erythema multiforme–like, pityriasis rosea–like, and Grover disease–like manifestations.[4] Most of these reports lack clinical images, due to safety concerns.[5] The cutaneous manifestation of COVID-19 is certainly not limited to the aforementioned lesion and as the literature of COVID-19 is rapidly evolving, we can expect reporting of even more variety of skin lesions associated with this menace.

In this regard, the published data from Pakistan is scarce. After an exhaustive survey, we only found one recent study published from Pakistan which found the frequency of cutaneous manifestations associated with COVID-19 to be 11 (2.7%) out of 412 patients.[6] Thus, we attempted to describe skin manifestations of COVID-19 in the Pakistani population. This new knowledge can be extremely useful to manage patients, to recognize patients of COVID-19 who have otherwise few typical symptoms, and might provide prognostic information related to the national population. The recognition of COVID-19 patients with the atypical presentation but having skin manifestations could also be helpful for epidemiological control especially in areas where diagnostic tests are scarce like in Pakistan due to financial restraints.[7]

For all these reasons, we conducted a dermatological case collection survey, to quickly describe the cutaneous manifestations of COVID-19 disease and to relate them to disease severity at a tertiary care hospital in Rawalpindi, Pakistan which has been declared a COVID hospital to manage the pandemic. Despite safety concerns, our data is supported by clinical images keeping in view strict compliance with the personal protective measure as per WHO (World Health Organization) guidelines.

Materials and Methods

This descriptive, cross-sectional study was carried out at the department of dermatology, Benazir Bhutto Hospital, Rawalpindi. Non-probability and purposive sampling techniques were used to induct the subjects into the study. The study commenced after authorization by the ethics committee. All patients, or their next of kin, gave informed verbal consent before enrollment in the study to use their data and pictures in publications. Afterward, senior dermatology postgraduate residents who were deputed in COVID-19 wards at Dermatology Department, Benazir Bhutto Hospital, Rawalpindi enrolled 150 patients in the study for 9 months from March 2020 till December 2020. All patients with an eruption of recent onset (previous 2 weeks) and no clear explanation, plus confirmed COVID-19 status (either with laboratory confirmation of SARS-CoV-2 PCR or HRCT findings consistent with COVID-19) were included. An online training session for residents was conducted by the consultant dermatologist of Rawalpindi Medical University to familiarize them with various skin manifestations of COVID-19. Residents asked and examined patients about skin involvement. Pictures were taken of any skin implication of COVID-19 and forwarded along with full demographic details and clinical summary (including current medical treatment details) on a performed proforma to the database established in the department of dermatology of Benazir Bhutto Hospital. The consultant then analyzed the lesions and classified them into various cutaneous patterns. All patients who did not have any skin manifestation were also reported similarly. Analysis was done using SPSS v.23.

Results

A total of 150 patients presenting to Benazir Bhutto Hospital with the diagnosis of COVID-19 were screened. The mean age of the subjects was 51.9 ± 17.2 years. There were 94 (62.7%) males and 56 (37.3%) females. The mean duration of illness at the time of screening was 12.5 ± 9.7 days. Out of 150 patients, 110 (73.3%) had positive COVID-19 PCR test results

whereas 40 (26.7%) were diagnosed on basis of HRCT findings. This is summarized in Table 1. Demographic characteristics and duration of illness at the time of screening with and without rash are summarized in Table 2. All patients with rash were males and had positive COVID PCR. Duration of illness at the time of screening in patients with rash was 8.6±3.4 days.

Most of the patients did not show any specific or non-specific dermatological manifestations related to COVID-19. Only 7 (4.7%) COVID-19 patients showed skin lesions. These included generalized bullous pemphigoid-like (1 patient), urticarial lesions (1 patient), vesicular eruption/chickenpox-like (1 patient), skin necrosis (1 patient), and maculopapular rash (3 patients). This is illustrated in Figure 1. Among the patients with maculopapular eruption, two had generalized morbilliform rash whereas one had erythema elevatum diutinum like lesions. This is shown in Table 3. Most of the patients with a rash had a generalized rash but the patient with skin necrosis had involvement of intergluteal cleft and buttocks only. The majority of patients with a rash had mild to moderate symptoms except the patient having skin necrosis who had severe disease and required HDU care. None of the patients with a rash had a history of any chronic dermatological disease. They had not taken any drug in the preceding 4 weeks of the eruption. The rash resolved spontaneously in the majority of patients (urticarial, vesicular, morbilliform and erythema elevatum diutinum like) without any specific treatment after resolution of fever. However, the patient with bullous pemphigoid-like lesions (Figure 1-b) and generalized morbilliform rash (Figure 1-d) required oral steroids. The patient with morbilliform rash (Figure 1-d) also had a prolonged rash of more than a month. The patient with skin necrosis had a prolonged course of severe illness with several days of HDU care but did not require mechanical ventilation.

Figure 1: Dermatological manifestations of COVID-19(All pictures were taken with the consent of patients***

Table 1: Demographics & other characteristics of COVID-19 patients

Total number of patients (N)	*150*	
Mean age of patients	51.9 ± 17.2 years	
Gender	**Male**	94 (62.7%)
	Female	56 (37.3%)
Covid-19 PCR	**Positive**	110 (73.3%)
	Negative	40 (26.7%)

Table 2: Demographics & other characteristics of COVID-19 patients (with and without rash)

Characteristic	*Rash, n=7*	*No rash, n=143*
Age, mean (SD)	41.6 (17.4) years	49.7 (16.7) years
Male sex, n (%)	7 (100%)	87 (60.8%)
Female sex, n (%)	0 (0%)	56 (39.2)
PCR positive, n (%)	7 (100%)	103 (72.0%)
HRCT positive, n (%)	0 (0%)	40 (28.0%)
Duration of illness at screening, mean (SD)	8.6 (3.4) days	12.1 (9.3) days

Table 3: Dermatological patterns of COVID-19

Clinical Pattern	*Number of patients (n)*
Bullous pemphigoid like	1
Urticarial lesions	1
Vesicular eruption	1
cutaneous necrosis	1
Maculopapular rash	Generalized morbilliform 2
	Erythema elevatum dinutum like 1

Discussion

Viruses can cause characteristic exanthems which help the clinician make a diagnosis even before the laboratory confirmation. Contrary to the initial belief that COVID-19 does not involve skin but can cause different skin manifestations which are important to identify. However, none of the skin manifestations are specific or diagnostic for the disease. It is also not known what proportion of COVID-19 infected patients develop cutaneous manifestations and the underlying mechanisms. However, doctors need to be vigilant about the possibility of COVID-19 in a patient with a suggestive rash.[8]

There is quite a variation in the prevalence of COVID-19 associated skin manifestations around the globe. Data from an Italian study suggested 20% of patients had skin disease.[3] In the United Kingdom, data from users of the COVID Symptom Study application suggested that 8.8% of 336,847 users, reported a skin rash.[9] In a recent study from New York, the prevalence of mucocutaneous eruptions among a racially diversified cohort of hospitalized adults to be 11.8%.[10] Thus the data from the Western world is showing quite a high association of skin lesions with COVID-19. However, data from Asian countries like China is presenting a sharp contrast. Among 1099 COVID-19 confirmed patients, only 0.2% presented with skin rash. In our study too, only 4.7% presented with the rash. Whether this is due to racial variation or differences in viral strains prevalent in different parts of the world, needs further research.[11]

Recent publications have also made a very interesting observation of the relative absence of COVID-19 related skin rashes in dark-skinned individuals. Indeed, Among 318 cases of COVID-19 related perniosis, very few patients of non-European descent were found. Also, there was a virtual absence of "Covid toes" among a large population of African-American and Hispanic patients during the COVID-19 outbreak in New York City.[12] We, too, could not find a single patient of COVID toes in all of our screened 150 patients.

Similar observations have been made by a recent review. Cutaneous manifestations were found to be more common among Europeans and United States residents than among Asians, as was pseudo-chilblain, and the morphology of the skin lesions varied among continents. Pseudo-chilblains were the most common COVID-19 skin manifestation in Europe and the United States, but there was only 1 reported case from the Asian population.[13] They also identified demographic differences in the prevalence and the morphology of the skin manifestations in COVID-19. Of the 1211 patients with COVID-19–associated skin manifestations, 39 (3.1%) patients were from Asian populations and 1172 (96.9%) patients were from Europe and the United States. This huge difference between the prevalence of cutaneous manifestations in Europeans and United States residents compared with Asians could be attributable to underreporting in Asian countries. However, in countries with a heterogeneous racial make-up, such as the United States, African-American, and Latino populations have been disproportionately affected. The implication of genetic factors in polymorphous cutaneous reactions in COVID-19 remains to be explored. Our study also supports these observations. Despite an exhaustive inquiry from the 150 enrolled patients, we could only get 7 patients with skin manifestations. In another study by Dalal, et al. reported dermatological manifestations in 13 patients (12.7%) from North India.[14] Whether this is the distinctive genetic makeup of the Pakistani population, or a different strain of virus is prevalent here, are the doors for future research.

A systemic review tried to characterize the severity of COVID-19 disease with the type of cutaneous manifestations. It concluded that the mere presence of skin manifestations in COVID-19 patients is not an indicator for the disease severity, and it highly depends on the type of skin lesions. Chilblain-like and vascular lesions are the two ends of a spectrum in which from chilblain-like to vascular lesions, the severity of the disease increases, and the patient's prognosis worsens.[15] Our study also supported these findings. The only patient with severe disease had vascular/ necrotic skin lesions.

Cutaneous lesions occur most often in middle-aged individuals at the same time or after the systemic symptoms of COVID-19. In our study, we also found a mean age of 41 years in patients with rash. Urticaria-like lesions commonly occurred at the same time as other symptoms. A maculopapular rash is the main reported skin involvement in COVID-19 patients and is associated with intermediate severity of the disease.[15] We also found the majority of patients have a maculopapular rash (n=3).

The pathogenesis of cutaneous manifestations in patients with COVID-19 is still evolving. Polymorphous cutaneous manifestations in patients with COVID-19 infection could potentially reflect a full spectrum of viral interactions with the skin, characterized by direct viral action in infected cells,

immune system hyperactivity, and hypercoagulability.[16]

In summary, this study strongly supports the inclusion of skin rashes in the list of suspicious COVID-19 symptoms. Although they are less prevalent than fever, they are more specific and last longer, and can be easily spotted by patients. Thus increased awareness from the public and healthcare professionals regarding COVID-19 skin changes will allow more efficient detection of infection and contact tracing.[17]

Conclusion

The skin manifestations of COVID-19 in Pakistan are much lower compared to reports and data from the western world. However, they are in accordance with the data reported from few Asian countries. Regardless of it, the type and association of skin lesions with COVID-19 disease severity appear to be universal. This difference in prevalence can be attributed to the racial differences and variety of viral strains predominant in different countries. Our study is the first of its kind in this country to throw light on these important facts. However, further studies are required to dig further into the reality.

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