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Cutaneous manifestations of COVID-19

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Abstract---The coronavirus 2019(COVID-19) pandemic, caused by severe acute respiratory syndrome coronavirus (SARS-CoV-2), has had enormous health, economic, and social consequences. Cutaneous manifestations associated with COVID-19 probably reflect the activation of pathogenic pathways by the virus or a response to inflammatory processes, vascular or systemic complications, or even treatments. There is no previous detailed classification or description of the cutaneous manifestations of COVID-19. This information may prove useful to manage patients and to recognize paucisymptomatic patients and might provide prognostic information. The recognition of paucisymptomatic patients could also be helpful for epidemiological control, especially in areas where diagnostic tests are scarce. This is a cross-sectional study among the COVID positive patients admitted in Index Medical College Hospital and Research Centre (Tertiary Care Centre) Indore from 1st May 2020 – 30th November 2020. Considered initially as of little relevance, the dermatological manifestations observed in patients with COVID-19 are both heterogeneous and complex. 5 main categories of lesions identified; vesicular rashes, urticarial rashes, acral lesions, maculopapular rashes and livedoid & necrotic lesions.

Keywords---COVID-19, Cutaneous manifestations, Coronavirus, Virus, Pandemic.

Introduction

Cases of pneumonia of unknown origin were reported in December 2019 in Wuhan, China. They were subsequently discovered to be caused by a novel pathogen, severe acute respiratory syndrome coronavirus (SARS-CoV-2), isolated from the lower respiratory tract of affected patients ^[1].

The frequently encountered manifestations with SARS-CoV-2 include fever, dry cough, and dyspnea. Less common are odynophagia, gastrointestinal symptoms, and anosmia or ageusia. Pneumonia affects a high proportion of patients, typically bilaterally, and this may lead to respiratory failure and the need for respiratory support^[2].

Infection can also arise without symptoms or with very mild symptoms, and patients with these forms are probably potent vectors helping to spread infection. From the pathogenic factor of view, the immune response prompted by infection with SARS-CoV-2 may bring about dangerous effects, such as endothelial cell dysfunction and activation of coagulation pathways; this may explain the cardiovascular and thrombotic complications that have an effect on a subgroup of patients^[3].

There additionally have been reports of a pattern of microvascular thrombotic disease mediated by complement in the skin of patients similar to that seen in livedo racemose lesions and retiform purpura, with C5b-9 and C4d deposition. Activation of those mechanisms and interference in ACE2 function in target tissues due to viral action causes an increase in angiotensin 2, associated with greater inflammation and oxidative stress. The release of these reactive oxygen species and interference in antioxidant activity may increase complement activation^[4].

Articles published at the start of the pandemic in China considered skin manifestations as a minor and nonspecific sign, with rash reported in 0.2% of patients^[5]. However, this observation may presumably have been conditioned by the lack of dermatologists caring for patients affected by COVID-19 at the start of the outbreak. The recent literature shows a surge in reports of the cutaneous manifestations seen in COVID-19. These range from varicella-like eruptions, acute urticaria, chilblain-like lesions, and maculopapular exanthem to livedo reticularis.

Methods

Study design:

Cross-sectional study at Index Medical College Hospital And Research Centre (DEDICATED CENTRE FOR COVID-19)

The time duration of the study was 1st May 2020 – 30th November 2020

The study included covid positive patients admitted in the covid ward of our hospital. After taking detailed history, general physical examination and a meticulous cutaneous examination was performed by the dermatology residents posted in the covid ward. Data was collected regarding the total number of patients showing cutaneous symptoms, sex wise distribution and the type of manifestations. After the completion of the study, data was charted and final values were obtained.

Results

We collected data of 1200 cases from 1st May 2020 to 30th November 2020. Out of which 700 were males and 500 were females. From 1200 cases examined 420(35%) patients had cutaneous manifestations. The lesions may be classified as maculopapular eruptions (105 patients,8.7%) ,vesicular eruptions (89 patients, 7.4%), urticarial lesions (82 patients, 6.8%), acral areas of erythema with vesicles or pustules (pseudo-chilblain) (76 patients,6.3%), and livedo or necrosis (68 patients, 5.6%). Vesicular eruptions appear early within the course of the disease (13 % precede other symptoms). The pseudo-chilblain pattern frequently appears late in the evolution of the COVID-19 disease (8 % after other symptoms), while the remainder tend to appear with other symptoms of COVID-19. The severity of COVID-19 shows a gradient from less severe disease in acral lesions to more severe in the latter groups.

Discussion

Due to the dearth of large-scale prospective research, the true incidence of cutaneous manifestations is difficult to ascertain . The existing literature reveals an extensive disparity in the incidence of cutaneous manifestations, ranging from 0.6% to 20.4%^[6]. Whether this displays geographical variation or the documentation remains to be seen. The probability of identifying skin changes is high if the primary care team involves a dermatologist.

A single virus can induce diverse clinical patterns, which is rare based on previous investigations with cutaneous manifestations of viral illnesses, especially because different patterns do not coexist in the same patient. Patients who may be classified as having multiple patterns are very uncommon. A hypothesis to explain this polymorphism may be that some of them have alternative causes, or there are variations in the virus or the host. The fact that some of the lesions, even in patients with confirmed COVID-19, are similar to those in other viral infections (notably parvovirus)^[7], and the perceived multiplied of cases of zoster, raises the possibility of some of these being the result of coinfection and uncertainty as to whether or not SARS-CoV-2 is responsible for this.

Maculopapular Rash

Perifollicular distribution and varied degrees of scaling were seen in some of these cases. Few were similar to pityriasis rosea. Purpura appeared on occasion, either punctiform or in larger areas. A few cases showed infiltrated papules at the extremities, mostly the dorsum of the hands. It is hard to associate these skin rashes with the viral infection due to their nonspecific appearance and

concomitant medication use. Possible association with viral infection in cases given that the rash resolved despite persisted drug use.

Vesicular Lesions

There were 36 (40%) confirmed instances of Herpes Zoster and 24 (27%) confirmed cases of Herpes Simplex among the 89 patients with vesicular eruptions. The lag from the onset of symptoms of COVID-19 to the development of skin manifestations was relatively short, 3 days (range, 2 to 12 days). Majority patients presented with complete clinical manifestations of the disease, with general and respiratory manifestations^[8].

Vesicular lesions, with common trunk involvement, usually scattered distribution, and mild/absent pruritus, the latter being in line with most viral exanthems however unlike true varicella. Although the lesions were dispersed, an extensive disseminated pattern was more frequent. In some patients, the legs had been affected by the presence of hemorrhagic content with diffuse distribution. These lesions were more common in middle-aged patients with intermediate disease severity, and developed earlier than the onset of fever and cough, and lasted for a mean of 10 days. The varicella-like eruptions might be coincidental as they resemble lesions produced by other parvoviruses.

Urticarial Rash

These skin manifestations have been evident more or less at the same time as other general and respiratory symptoms. Lesions occurred predominantly on the trunk, face, and hands. Resolved in about 7 days. They were nonspecific rashes hence difficult to establish a solid relationship with a viral infection, bearing in mind that the patients who presented with these lesions often obtained a range of treatments such as antivirals, antibiotics, hydroxychloroquine, anticoagulants, and support treatments that could trigger skin reactions. Patients developing urticaria were found to have severe disease with higher mortality. However, it seems doubtful if these urticarial lesions represent a manifestation of COVID-19 itself or are drug-induced as sick patients are on multiple drugs.

Acral or Acroischemic Lesions

Over the hands and feet, erythematous lesions, edoema with few vesicles or pustules, with or without purpura. Purpuric lesions resembling chilblains affected the hands and feet. They were usually asymmetrical. Pseudochilblain lesions have also been reported. Mainly in young patients, generally late in the course of the disease, and were present for a period of few days, commonly in patients with mild disease or asymptomatic individuals. The lesions were described as painful or itchy. The strongest evidence of association with viral infection was therefore that presentation occurred during the pandemic (and in a different context to that of chilblains, in the warmer months than when they commonly appear)

Livedoid or Necrotic Lesions

Relatively uncommon. Reported especially in aged patients with prior comorbidities and severe forms of COVID-19 infection. Considered secondary to vascular micro-occlusion and acral ischemia due to general deterioration in the patient's state and/or the coagulation disorders attributed to COVID-19. In few patients, episodes of patchy livedo reticularis were reported that presented over the course of minutes or hours, of an uncertain nature and benign course^[9].

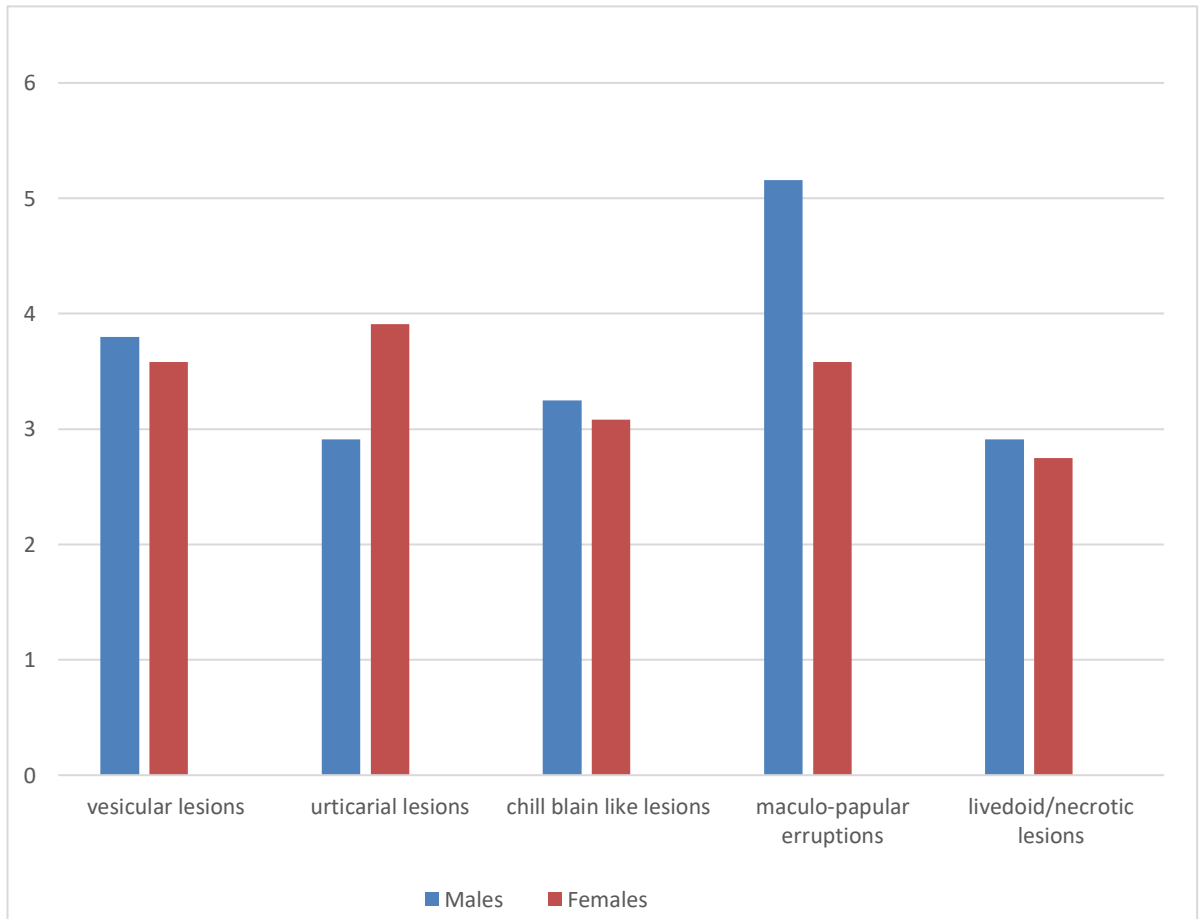


figure 1: Sex wise distribution of Cutaneous Manifestations

Conclusion

It is difficult to specifically assign the cutaneous manifestations to COVID-19 to the virus itself due to lack of histopathological and virological confirmation in maximum studies. It is even difficult to obtain photographs because of the risk of disease transmission. The findings reported to date may not be complete, and new manifestations will be introduced with time. There is a need to develop

countrywide registries to maintain records of cutaneous manifestations. With a better understanding of the pathogenesis of the disease, in addition to its cutaneous manifestations, their significance will be clear^[10].

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