

Multifarious dermatological manifestations at state covid hospital, nellore in covid-19 patients - A prospective observational study

M. Nagasayana Rao¹, G Sumalatha^{2*}

¹Associate professor DVL, AC Subba Reddy Government Medical College, Nellore, Andhra Pradesh, India

²Senior resident, AC Subba Reddy Government Medical College, Nellore, Andhra Pradesh, India

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Abstract

Background: Coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the ongoing pandemic has infected and affected people in a very short span of time. The skin being the window of several diseases, diverse cutaneous findings have been observed in patients with COVID-19 and their importance is yet to be known. **Objective:** our study aims to know the various cutaneous presentations in patients with COVID-19, their possible underlying mechanism behind. **Methods:** An prospective observational study was done in confirmed covid 19 patients of both out patient and inpatients at ACSR Medical College, Nellore during the period of October 2020 to July 2021. All patients have gone thorough clinical examination and has been observed for various cutaneous manifestations. **Results:** Total of 200 patients were included in the study with males being 117 and females being 83. The number of patients admitted (IPD) included were 107 and outpatient (OPD) were 93. The following cutaneous manifestations that were observed in admitted patients were oral candidiasis, tinea corporis et cruris, aphthous ulcers, miliria, mucormycosis, purpura, herpes zoster, petechiae, psoriasis vulgaris, livedo reticularis. Similarly the cutaneous findings in outpatient were acute urticaria, telogen effluvium, Maculopapular rash, acneform eruptions, maskne, fixed drug eruption. **Limitation:** As this is a hospital based study and may not reflect the pattern of cutaneous manifestations in the community and no proper histopathological correlation due to pandemic. **Conclusion:** COVID-19 virus through different mechanisms and by several factors results in various dermatological manifestations, in addition to other systemic and pulmonary manifestations in covid patients.

Keywords: corona virus, COVID-19, cutaneous manifestations, dermatological findings, IPD, OPD

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Introduction

The SARS-CoV 2 virus is studded with spikes that in cross section gives it appearance of crown. Hence the name corona [1]. SARS-CoV 2 is an enveloped virus with single-stranded RNA and its entry in to the cells of the body is by the angiotensin converting enzyme 2 receptor [2]. The outbreak of COVID-19 has been declared as a Public Health Emergency of International Concern by the World Health Organization (WHO) on March 13, 2020 [3]. Inexplicably, there were reports of various presentations of cutaneous manifestations where not much is known about the physiopathological mechanisms behind these manifestations. Their identification could be important for early better diagnosis in COVID-19 patients [4]. Our study aims to observe the reported cutaneous findings of COVID-19 at the hospital that might attain their clinical significance in the sweep of time as we get better documentation

Materials and Methodology

This is a prospective observational study assessing a total of 200 patients diagnosed as COVID-19 according to RT-PCR or Rapid antigen test and CT scan and got admitted at ACSR Medical college and general hospital Nellore and suspected covid patients whose clinical presentations were relevant and others who were confirmed post covid patients were included in OPD basis during the time period of October 2020 to July 2021. The patients included were both OPD and IPD basis that includes both general wards and intensive care unit. We took the consent from the patients and examined them thoroughly with proper care and got the details of their past medical conditions and took the clinical pictures. All patients has given their consent to participate and use their photographs for the current study. Both Unwilling uncooperative patients were excluded from the study. The data obtained was represented by graphical representation.

Results

We examined and collected data from a total of 200 patients of which 117 were males and 83 females in both IPD and OPD basis. 107 were examined in IPD, among them 85 were RT PCR positive and 22 tested negative. In the latter, 93 patients were examined on OPD basis. 13 cases out of 93 outpatients were suspected to have covid and sent for confirmation and rest 80 were identified as Post covid. It was known during the history taking of two patients admitted that they had previously past history of psoriasis and exacerbated in covid 19 due to usage of native medication. The clinical cutaneous findings observed in 107 IPD patients were oral candidiasis (19.6%), tinea corporis et cruris (17.7%), aphthous ulcers (16.8%), miliria (15.8%), mucormycosis (10.2%), purpura (6.5%), herpes zoster (5.6%), petechiae (4.6%), psoriasis (1.8%), livedo reticularis (0.9%). The most common being oral candidiasis the next common being tinea corporis et cruris and least clinical presentation was livedo reticularis. Similarly the dermatological manifestations in OPD 93 patients were acute urticaria (26.8%), telogen effluvium (16.1%), maculopapular

*Correspondence

Dr. G Sumalatha

Senior resident, AC Subba Reddy Government Medical College, Nellore, Andhra Pradesh, India

E-mail: sumasunrises@gmail.com

rash (24.7%), eczema (12.9%),acne form eruptions (10.7%), maskne (6.4%),fixed drug eruption (2.1%) . The most common presentation observed was acute urticaria followed by maculopapular rash and least presentation noted being fixed drug eruption. On observation

between cutaneous findings of IPD and OPD patients it is noted that the patients in ICU carried a greater risk of cutaneous manifestations due to prolonged stay and improper hygiene by the patients in addition to COVID-19 infection.

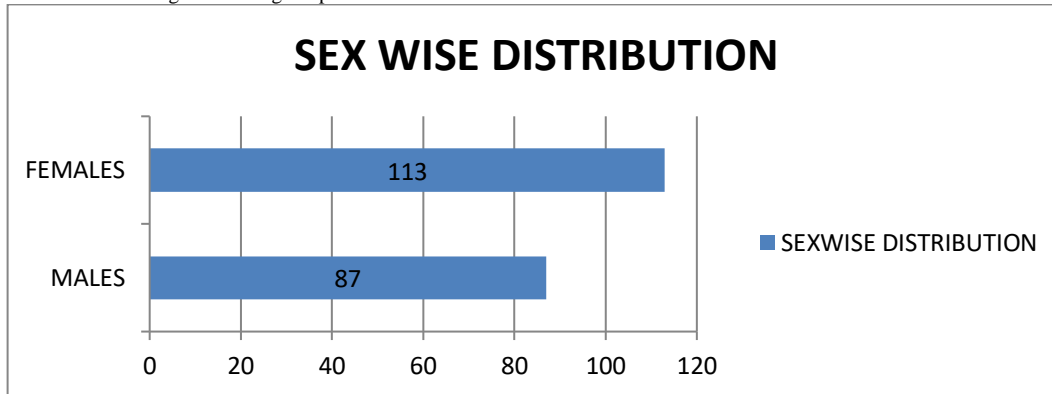


Fig 1: Cutaneous manifestations observed on IPD basis

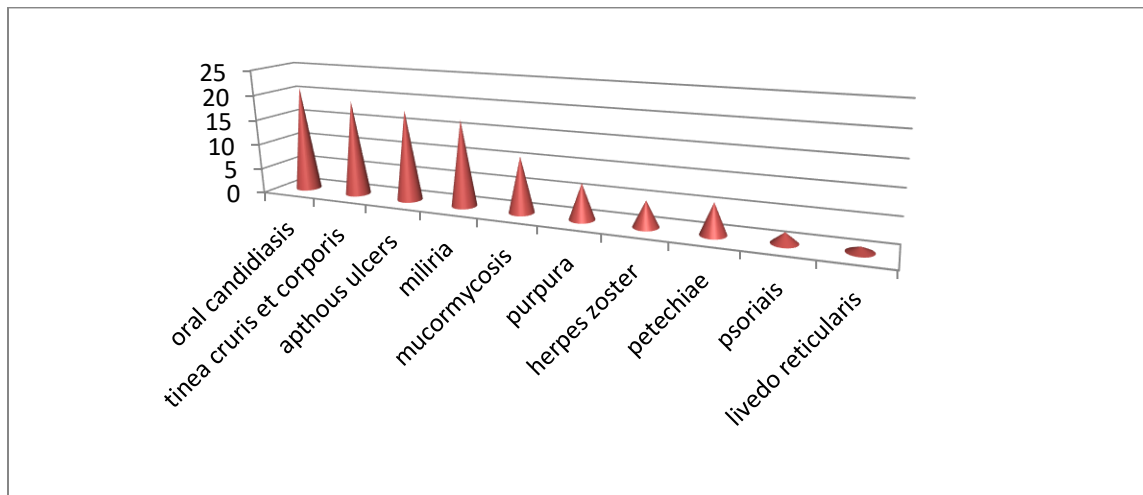


Fig 2: Cutaneous findings observed on OPD basis

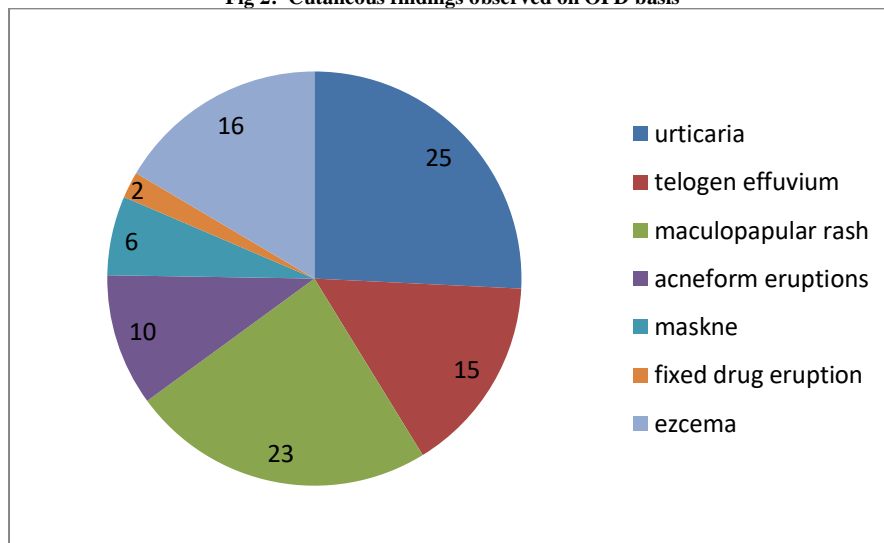


Fig 3:clinical photographs



Fig 4:Truncal acne



5 Aphthous ulcer



6 Miliria



7 Erythrodermic



8 oral candidiasis



9 Tinea cruris et corporis psoriasis



10 Purpura



11 maculopapular rash



12 livedo reticularis



13 Maskne



14 fixed drug eruption



15 urticaria



16 vMucormycosis



17 early herpes zoster ophthalmicus affecting ear



18 Palmar eczema

Discussion

COVID-19 has a incubation period for up to 14 days with mean time of 3-5 days from day of exposure to presenting symptoms, present with diverse Cutaneous manifestations that can be a indicator of covid 19 infection and can aid in diagnosis[6,7]. The frequency of dermatological presenatations in covid paients range from least being 0.2% to 20.4% being the highest[11,12,13].

The mechanisms of manifestation of COVID-19 are not yet established, and there are few common theories that are relevent. It is assumed to be that covid-19 virus in the cutaneous blood vessels may have caused cutaneous lymphocytic vasculitis which is identical to thrombophilic arteritis caused by activated cytokines through deposition of blood immune complexes . The Keratinocytes could be the second target cell after the activation of Langerhans cells leading

to vasodilation and spongiosis histopathologically that may cause spectrum of various cutaneous manifestations[4,5].

It is uncertain that either these dermatological presentations are due to consequence secondarily to respiratory infection or primary infection of the skin itself. It is probable that a amalgamation of such mechanisms could be the reason for the various cutaneous findings found in COVID-19 individuals[8].

In the current study, we assessed the skin manifestations of both the admitted and outpatients due to infection with COVID-19. In the current study, 42.5% of 85 covid patients who got admitted in wards and intensive care unit manifested diverse cutaneous findings during COVID-19 infection. Ozge Askin et al stated that 24% out of 52 patients who were hospitalized had cutaneous manifestations like scaly erythematous rash ,maculopapular and urticarial rash , canker sores , vesicular rash[13] . Recalcati et al published that 20.4% of 88

diagnosed covid 19 showed cutaneous findings like urticarial erythematous rash, and vesicles similar to chickenpox[10].

A medical ward at Spanish had collected data nationwide from patients of 375 and lesions were classified as acral erythema presenting with either pustules or vesicles (pseudo-chilblain), and other vesicular eruptions, urticarial and maculopapular rash, and livedoreticularis or necrosis[14].55 Of 85 hospitalized patients at the ICU showed 64.7% of cutaneous manifestations in our study . The greater percentage of cutaneous manifestation of patients at the ICU may be due to the prolong hospital stay or due to use of high dose of steroids for prolonged period and improper hygiene .In two separate reports by Mahe and Estébanez, there was a link between severity of skin lesions and covid 19 in two patients i.e (8.7%)[9]. Patients with past history of comorbidities had a greater percentage of dermatological manifestations than in those without comorbidities in similar with Ozge Askin et al[13]. In our study 92.9% had comorbidities like diabetes mellitus.

The most commonly observed skin manifestation in COVID-19 patients in the current study were acute urticarial rash followed by maculopapular rash. The various dermatological manifestations observed in our study are as follows and possible mechanisms:

1)Urticarial and maculopapular rash:viral infections are most frequently associated with non specific maculopapular and urticarial rash, and its pathogenesis is postulated that virus enter the epithelial surfaces of pharynx and lymphoid tissue and dissemination occur causing initiation of viremia and major viremia occur during period of replication,and this correlates with the viral manifestation[9,10,14-17,36].

2)**Pupura,petechiae and livedo reticularis:** virus entering the cells and lodgement of microthromboses causing decreased flow of blood to the cutaneous microvasculature system and similar lymphocytic infiltrate with red cell extravasation and papillary edema was noted resulting purpura and petechiae[25-29].

3)**Oral candidiasis and tinea infections:** In patients of covid 19 with diabetes mellitus on systemic steroids there is rapid increase in growth of superficial and yeasts growth.As these are immunosuppressive conditions(covid infection and diabetes mellitus and immunosuppressive effect of steroid) [32-33].

4)**Apthous ulcers:** etiology of apthous ulcers is not clear and various environmental factors like stress and malnutrition of patients can cause apthous ulcers[19].

5)**Miliria:** As there is prolonged duration of stay of covid patients in the hospital who are nursed on their backs that has occlusive membrane below the bedsheets causing disruption of eccrine sweat glands that lead to leakage of sweat presenting as miliria[18].

6)**Psoriasis:** Psoriasis exacerbate and progress to erythroderma due to usage of native medication.During pandemic as there was massive usage of native medication that lead to exacerbation of existing psoriasis[22-23].

7)**Eczema:** Allergic contact dermatitis is other exogenous cause of hand eczema . latex powder being the most common allergen and its usage by medical personnel and might lead to hand eczema[20-21].

8)**Acneiform eruptions:** following administration of systemic steroids in covid patients acneiform eruptions occur in covid patients after 2 weeks of administration of systemic corticosteroids being most common at trunk ,shoulder and upper arms[24].

9)**Telogen effluvium:** post covid 19 patients ,experience rapid increase in hair fall , that occur when more hair than normal enter the shedding (telogen) phase of hair growth cycle , due to sudden stress to the body and covid associated febrile illness[34].

10)**Herpes zoster:** Herpes zoster which is caused by reactivation of zoster virus in immunocompromised patients is observed in covid 19 patients .As it is a stressful condition that triggers and reactivate the dormant virus[38].

11)**Maskne:** In view of ongoing pandemic people need to wear mask in all the public places and medical personale in hospitals causing hot and occlusive environment inside the mask and also due to friction that cause irritation of skin and led to maskne[37].

12)**Mucormycosis:** This was noted in some patients of covid with severe uncontrolled diabetes mellitus and high dosage of systemic corticosteroids[30-31].

13)**Fixed drug eruption:** covid -19 patients who were tested positive and having social stigma of being isolated,lead to misusage of drugs in pharmacy and led to fixed drug eruption[35].

Conclusion

In our study it is observed that the cutaneous manifestations in covid patients can occur consequence of primary infection of the skin itself due to the viremia presenting commonly as urticaria followed by maculopapular rash, or due to dissemination of infection into the blood vessels causing petechie and purpura and others due to prolonged stay of patients in hospital that causes patients prone to increase of fungal infections .or due to side effects of the drugs used to treat the patient presenting like acneiform eruptions.

Limitations

The limitation of our study was that we just observed the details of IPD and OPD with poor evidence as we could not perform histopathological confirmation for accuracy due to ongoing pandemic . It is likely that our research quality would improve over time..

References

1. Kuby immunology “ infectious diseases and vaccines “ part 6 , 7th edition , page no 572-73
2. Y.R. Guo, Q.D. Cao, Z.S. Hong, Y.Y. Tan, S.D. Chen, H.J. Jin, K.S. Tan, D.Y. Wang, Y.Yan, The origin, transmission and clinical therapies on coronavirus disease2019 (COVID-19) outbreak—an update on the status, Mil. Med. Res. 13 (March(1)) (2020) .
3. CoronavirusDisease(COVID-19)-Events as They Happen [Internet]. Rolling Updates on Coronavirus Disease (COVID-19)., World Health Organization,2020. [cited 2020 Apr 13].
4. Harjas Singh, Harleen Kaur, Kanhaiya Singh, and Chandan K. Sen.Advances in Wound Care.Feb 2021.51-80.<http://doi.org/10.1089/wound.2020.1309>
5. R. Gianotti, COVID 19 and the skin—heuristic review, DermoSprint.(2020)01) April 06. In press
6. R. Gianotti, P. Zerbi, R. Dodiuk-Gad, Histopathological study of skin dermatoses in patients affected by COVID-19 infection in the Northern part of Italy, J.Cosmet. Dermatol. Sci. Appl. (2020) In press.
7. I.F. Manalo, M.K. Smith, J. Cheeley, R. Jacobs, A dermatologic manifestation COVID-19: transient livedo reticularis, J. Am. Acad.Dermatol.(April10(2020)
8. Sachdeva M, Gianotti R, Shah M, et al. Cutaneous manifestations of COVID-19: report of three cases and a review of literature. J Dermatol Sci. 2020;98(2):75-81.
9. Recalcati, Cutaneous manifestations in COVID-19: a first perspective, J. Eur. Acad. Dermatol. Venereol. (March 26) (2020), doi:<http://dx.doi.org/10.1111/ijdv.16387>
10. De Giorgi V , Recalcati S, Jia Z ,et al.cutaneous manifestations related to coronavirus disease 2019(COVID-19): A prospective

- study from china and Italy . J Am Acad Dermatol.2020;83(2):674-75
11. Jia JL, Kamceva M,Rao SA,Linos E. Cutaneous manifestations of COVID-19:A preliminary review . J Am Acad Dermatol.2020 Aug;83(2):687-690
 12. Askin O,Altunkalem RN, Altinisik DD,Uzuncakmak TK,Tursen U,Kutlubay Z.Cutaneous manifestations in hospitalized patients diagnosed as COVID-19.Dermatologi therapy.2020;33:e13896
 13. Galván Casas C, Català A, Carretero Hernández G, et al. Classification of the cutaneous manifestations of COVID-19: a rapid prospective nationwide consensus study in Spain with 375 cases. Br J Dermatol.2020;180(1):71-77
 14. Tang K, Wang Y, Zhang H, et al. Cutaneous manifestations of the Coronavirus Disease 2019 (COVID-19): a brief review. Dermatol Ther.2020:e13528.
 15. Mah_e A, Birckel E, Krieger S, Merklen C, Bottlaender L. A distinctive skin rash associated with coronavirus disease 2019? J Eur Acad Dermatol Venereol. 2020;34(6):e246-e247
 16. Leah T.Belazarian,Mayra E.lorenzo et al “Fitzpatrick’s dermatology in general medicine”,8th edition , volume 1 , chapter 192 , page no 2337-2366
 17. Christopher j ; burneel et al “ pathogenesis of viral infections “,Fenner and white medical virology . 2017: 77-104
 18. Jami L. Miller “diseases of the eccrine and apocrine sweat glands “ “JeanL.bologna textbook of dermatology “ 4th edition,volume 2 , chapter 39, Page no 643-644
 19. Cripian Scully ”dematoses of oral cavity and lips “rooks text book of dermatology , 9th edition , volume 3 , chppter110 , page no 110.26-30
 20. Ramasubramaniam Jayashree et al “ occupational dermatoses” Iadvl textbook of dermatology,4th edition, volume1, chapter23, page no 872-74
 21. Golar Honari et al ”occupational skin diaes due to irritants and allergens” “Fitzpatrick’s dermatology in general medicine”,8th edition , volume 2 , chapter 211 , page no 261
 22. A. David Burden and Brain kirby “ psoriasis and related disorders “rooks text book of dermatology , 9th edition , volume 2 , chapter 35 , page no 35.1-17
 23. Johann E.Gudjonsson et al ”psoriasis” “Fitzpatrick’s dermatology in general medicine”,8th edition , volume 1 , chapter 18 , page no 197-231
 24. Andrea L. Zanglein et al ”acne vulgaris and acneform eruptions” “Fitzpatrick’s dermatology in general medicine”,8th edition , volume 1 , chapter 80 , page no 915-17.
 25. Tabi A.Leslie“ PURPURA“rooks text book of dermatology , 9th edition , volume 3 , chapter101 , page no 90.10-16
 26. Bouaziz JD, Duong T, Jachiet M, et al. Vascular skin symptoms in COVID-19: a French observational study. J Eur Acad Dermatol Venereol. 2020;34(9):e451-e452.
 27. Bosch-Amate X, Giavedoni P, Podlipnik S, et al. Retiform purpura as a dermatological sign of coronavirus disease 2019 (COVID-19) coagulopathy. J Eur Acad Dermatol Venereol. 2020;34(10):e548-e549.
 28. Robert Kelly et al “other vascular disorders” “JeanL.bologna textbook of dermatology “ 4th edition,volume 2 , chapter 106, Page no 1847-49
 29. Bouaziz JD, Duong T, Jachiet M, et al. Vascular skin symptoms in COVID-19: a French observational study. J Eur Acad Dermatol Venereol. 2020;34(9):e451-e452
 30. Roderick J.Hay “ Fungal infections“rooks text book of dermatology , 9th edition , volume 1 , chapter32 , page no 32.94
 31. Bonifaz A, Tirado-sanchez A,Hernandez-medel ML,Kassack JJ,Araiza J,Gonzalez GM.Mucormycosis and cutaneous involvement . A restrospective study of 115 cases at a tertiary care hospital in mexico .Australas J Dermatol.2021;62(2):162-67
 32. Roderick J.Hay “ Fungal infections“rooks text book of dermatology , 9th edition , volume 1 , chapter32 , page no 32.61-63
 33. Stefan M.Schieke et al ”superficial fungal infection” “Fitzpatrick’s dermatology in general medicine”,8th edition ,volume 2 , chapter 188 , page no 2288-90
 34. Andrew G. Messenger et al “ Acquired disorders of hair “rooks text book of dermatology , 9th edition , volume 3 , chapter89 , page no 89.24-27
 35. Michael R.Arderm-Jones et al “ Beningn cutaneous adverse reactions to drugs “ rooks text book of dermatology , 9th edition , volume 4 , chapter118 , page no 118.11-14
 36. Hassan K. Urticaria and angiodema as a prodromal cutaneous manifestation of SARS-CoV-2(COVID-19)infection . BMJ case Rep .2020
 37. Wan-Lin Teo”diagnostic and management considerations for “maskne”in the era of covid -19” J Am Acad Dermatol. 202 Feb; 84(2):520-51
 38. K .A setharam.viral infections” Iadvl textbook of dermatology,4th edition, volume1, chapter 17A, page no 583-587

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