



COVID-19: Its association with Dermatological and Dental practices. A review

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ABSTRACT: The health professions and systems have been challenged due to the enormous reactions around the globe as response to Covid-19. It has affected each and every aspect of human health and resources. From its systemic involvement to cutaneous reactions, it has affected the oral health care aspect also. Cutaneous manifestations are an important aspect of study for allergy specialists, as they can be specific signs of the infection, but also manifestations of adverse reactions to the medical therapy in use is also very evident. The role of the dental professionals in preventing the transmission and responding to its long-term impacts on dentistry is also critically important. This review presents an overall impact of the virus on dental as well as dermatological practices and various triggering and associating lesions and diseases which come along. The impact it has on dental practices and how cutaneous reactions can be an important diagnostic tool.

KEYWORDS: COVID-19, pandemic, dental, aerosols, high vacuum pumps, cutaneous manifestations, skin lesions, rash

I. INTRODUCTION:

This article is a narrative and comprehensive review. COVID 19- The name itself is now very well known and established in the present world and future generations to come. The virus which totally changed the outlook of the world and laid a major setback to our efficient and developed medical science. In 2002, an outbreak of SARS was first reported in China and then spread quickly worldwide, resulting in hundreds of deaths with an 11% mortality rate. In 2012, the first case of MERS was seen in Saudi Arabia and later on spread to other countries, with a mortality rate of 37%. In both of these epidemics, the viruses were found to be originated from bats, then infected humans through other intermediate animal hosts, e.g. the civet (*Paguma larvata*) for SARS-CoV and the camel for MERS-CoV.

Beginning in December 2019, there was an outbreak in number of patients with pneumonia of unknown cause which emerged in Wuhan City, Hubei Province, Central China. Genome sequencing has demonstrated that this pneumonia, named coronavirus disease 2019 (COVID-19), is caused by a novel CoV, namely severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which was earlier known as 2019 novel coronavirus. Like SARS-CoV and MERS-CoV, this newly emerged SARS-CoV-2 virus is a family of B lineage of the β -CoV. Considering the global threat, the World Health Organization (WHO) declared COVID-19 a public health emergency of international concern (PHEIC).

The virus that causes COVID-19, SARS-CoV-2, is profusely present in nasopharyngeal and salivary secretions and was believed to spread primarily through respiratory droplets, as well as aerosols and fomites.

Importantly, emerging evidence showed that normal breathing and talking could produce small droplets that are subject to aerosol transport and that aerosolized SARS-CoV-2 particles can remain suspended in the air for several hours which later showed a lot of variation in its various forms. The various forms and its variation in its genetic aspect later on changed this and the variants were more contagious and transmitted at a faster pace. Skin lesions were also a very common variant which was found in patients with the virus and also amongst those who were undertaking the treatment. Cutaneous manifestations are an important study aspect for allergy specialists, as they can be an important sign of the infection, but it comes along with adverse reactions to the in use medical therapy. These can be seen in up to 20% of patients; SARS-CoV-2 infection has been associated with several skin manifestations, mostly similar to those observed in other common viral infections. These can represent an important finding to early diagnosis and intervention, especially in asymptomatic cases.



II. COVID AND DERMATOLOGY

The most common symptoms which we have seen in COVID-19 are fever, fatigue, and dry cough, followed by other symptoms, such as headache, nasal congestion, sore throat, myalgia, and arthralgia. At the beginning, no skin involvement was seen during COVID infection but later on skin problems related to personal protective equipment and other skin related reactions were seen. Secondary skin reactions to the different treatments were also seen. Therefore, skin diseases associated with COVID-19 can be classified as three main headings: skin problems associated with personal protective equipment and personal hygiene measures, skin reactions seen in SARS-CoV-2 virus infections, and skin findings due to COVID-19 treatment agents.

Skin problems related to personal protective equipment and personal hygiene measures

To control and prevent the spread of infection, all health personnel had to wear personal protective equipment (PPE) for long periods in addition to other safety and health measures. Eczema the most common problem among healthcare workers can be seen, and is secondary to frequent hand washing and long-time gloves wearing. Besides this, humidity, prolonged use of masks, and goggles also caused a variety of cutaneous diseases namely contact and pressure urticaria or contact dermatitis or pigmentation of the nasal bridge. The nasal bridge is considered to be the most affected area followed by hands, cheek, and forehead. Dryness and desquamation were the most common symptoms, and these damages depended on the hours of work, especially due to long gloves wearing. Wearing of gloves has caused in 88.5% of skin reactions. The other major cause because of frequent hand washing to prevent the disease, resulted in dry skin which was associated with erythema. There is an acceleration of preexisting conditions such as acne, rosacea, atopic dermatitis, and neurodermatitis which is mainly due to prolonged wearing of masks during the epidemic. The contact caused due to generated by protective hats may provoke pruritus and folliculitis or exacerbate seborrheic dermatitis, and the frequent use of disinfectant and soap can impair the hydrolipid mantle of the skin and increased the risk of contact dermatitis. The stress which resulted due to this global situation and confinement also accelerated dermatoses.

Skin findings observed in SARS-CoV-2 virus infections

Skin findings are also observed in SARS-CoV-2 virus infections. The incidence of skin

lesions due to COVID-19 have been reported to be in between 0.2% and 29%. Various skin lesions including maculopapular, urticarial, vesicular, chilblain-like, thrombotic/ischemic, etc. are seen in COVID-19 patients. There are also reports suggesting that there is an absence of SARS-CoV-2 virus infection-specific skin findings. However, in asymptomatic or presymptomatic COVID-19 patients in particular, skin lesions can also lead to the diagnosis of COVID-19. Erythematous rashes were the most common sign followed by urticarial and chickenpox-like vesicles. There have been cases where erythematous maculopapular lesions on the faces were also seen along with frostbite-like lesions. Studies also reported the presence of pernio lesion or chilblain lesions in acral skin. The localization of these lesions was in the feet in 84% of the cases, in the hands in 5.1% of the cases, and in both in 10% of the cases. Various reports suggested acral lesions with, four clinical patterns such as: acral erythema (30%), dactylitis (20%), purpuric maculopapules (35%), and mixed pattern (15%). A very recent publication suggested that papulovesicular eruption (varicella-like) was rare but specific to COVID-19.

Skin findings due to COVID-19 treatment agents

Preventive measures are currently considered to be the best strategy to fight COVID-19. Chloroquine / hydroxychloroquine (HCQ), a widely used antimalarial and autoimmune disease drug, had been demonstrated to control SARS-CoV-2. Chloroquine is widely used in dermatology disorders and autoimmune disease; its toxicity is infrequent, and reactions can be mainly gastrointestinal and cutaneous (pruritus or urticaria), usually mild but few cases of HCQ toxidermia had been reported. Acute generalized exanthematous pustulosis (AGEP) was the most common presentation, it appears like a sterile nonfollicular pustule with an erythematous base. Also, there are drug reactions with eosinophilia and systemic symptoms (DRESS) which had been reported. Besides, rare cases of HCQ and Sweet syndrome had also been seen. Other prescription drugs such as OTC, antibiotics, healthcare products, and a variety of plants can also cause skin reactions. Many cases of urticaria, urticarial vasculitis, and other pruritus lesions in coronavirus pneumonia patients after accepting anti-COVID-19 medicines were also seen.

Management of dermatological manifestations associated with COVID-19

Healthcare institutions and policy makers developed various plans to control the pandemic, including preparing hospitals and clinics,



developing a strategy for the identification of suspected COVID-19 cases, and implementing a strategy to reduce the spread. Many dermatological were transformed into a structure for the treatment and isolation of patients with COVID-19 infection, and many private dermatology practices had to be closed. Patient management was the foremost important criteria and emphasis was laid on this. Digital technology has come out to be a right solution for nonemergency patients. Most of the patients were interested in using tele-healthcare (medical consultations and electronically transmitted prescriptions). If the patient was mandatory, the dermatologist and the patient should both wear a surgical mask with hand hygiene. The dermoscopy should be performed with caution and was important to prevent dermatoscope from becoming a possible source of nosocomial spread. There is still not enough evidence or guidelines for management of the patients who are having severe inflammatory skin disorders and are treated with immunomodulators during this pandemic, and there is no such proof that these persons may have an increased risk of becoming infected with COVID-19. The first treatment choice should be given to those in this particular period who have lower effects on personal immune functions. Other treatment options include decreasing the dosage of traditional immune suppressants. In cases of skin cancer, if it is indicated surgical treatment should not be delayed, especially in cases of critical localization

The wearing of the PPE for an extended period and the cutaneous complications generated stress and anxiety. As such, it has been highly recommended to use latex-free gloves or use cotton gloves inside it in order to avoid cutaneous hand problems. The use of cleansing products containing moisturizing ingredients is advised. To avoid any contact friction and pressure from wearing the mask, it is suggested to wear a properly fitted mask, and apply moisturizers or gel before using it or combine a paper towel with facial mask to avoid direct contact.

III. COVID AND DENTISTRY

According to various reports and studies dentistry is one of the most exposed professions to the COVID-19 virus. It is important to establish a clinical protocol in the working environment to avoid new infections and prevent progressive virus spread. In daily clinical practice, the patient's oral fluids, material contamination, and dental unit surfaces can act as sources of contact both for the dentist and the co-workers, and for the patients too. Saliva and blood droplets that are deposited on the

surfaces or aerosol inhalation generated by rotating instruments and ultrasound hand pieces generate a risk for those who occupy or will occupy those environments. Therefore, the use of disinfectants and personal protective equipment remain essential for the proper development of the dental profession.

The sudden spread of SARS-CoV-2 has created the need to modify both preventive and therapeutic protocols in dental practice. The widespread transmission of SARS-CoV-2 who are pre-symptomatic or asymptomatic to transmit the virus to others, and the unique nature of dental interventions with close proximity of the provider to the patient's mouth and throat, all contribute to the high risk for dental personnel teams becoming exposed and transmitting the virus to other patients or staff.

Dental treatments and practices are directly or indirectly effected due to this virus and a lot of studies have been done and are still in process to evaluate the impact and association between the virus and dental procedures. As very well knows that most of the dental treatments involve the direct contact with saliva and aerosols, the risk increases eventually. As directed by American Dental Association, dental procedures were divided into two groups of emergency/urgent and routine/elective during the COVID-19 pandemic and later during the regressive period. As dental treatments are considered important, American Dental Association added urgent dental care as part of the emergency guidance. Emergency situations are life-threatening and need immediate attention to stop bleeding, reduce severe pain, or resolve the infection. Various dental diseases or associated ones are considered to be of immediate response and need to be treated immediately which included uncontrolled bleeding, cellulitis or bacterial infection with intraoral or extraoral swelling, trauma to the facial bones that can be fatal, severe dental pain due to pulpitis or third molar impaction. Postoperative osteitis, dry socket dressing change, local bacterial abscess or infection that has caused pain and local swelling, cementation of crowns or bridges when the temporary restoration is lost, broken, or has caused gingival irritation, biopsy of abnormal tissue, denture adjustment in patients under radiotherapy/chemotherapy. All these need immediate dental care and the patient need to be relieved from the pain and trauma.

During the COVID-19 pandemic, routine dental treatments were contraindicated, and emphasis was laid only on emergency and urgent treatments in all patients.



Patient screening has been an important aspect in dental treatments. Proper screening resulted in an easy way to deal with patient problems and allowed the immediate treatment required to be done. Patient with systemic diseases were at a higher risk so it was suggestive to schedule an early appointments for them. Patients who had been contaminated with virus had to be screened well before admission into operatory. Dental clinicians need to strictly follow all the standard precautions for the contact and other airborne infections, which include the proper use of PPE and the hand washing protocols. Its very important to protect the skin and mucosa against various infected secretions, and it has been highly recommended that the surgeon and the staff wear proper isolation gowns with surgical gloves, appropriate mask, safety glasses, and face shield before entering the operatory room. Dental clinicians should wash their hands prior to patient examination, before initiation of a dental procedure, after contact with the patient, after touching the non disinfected equipment and instruments, and specially after touching the oral mucosa, skin, wounds, blood, body fluids, or other secretions. Rinsing antimicrobial mouthwashes decrease the microbial load in the oral cavity. Intraoral radiographs were not requested due to the stimulation of saliva secretion and coughing. Dental clinicians are recommended to avoid procedures that generate droplets or aerosols such as the use of three- way syringes, high- speed handpiece, and ultrasonic scalers, as much as possible or minimize their application. The low- volume or high- volume saliva ejectors and rubber dam can decrease the generation of droplets and aerosols so the use of rubber dam in aerosol- generating procedures (namely high- speed handpiece and ultrasonic scalers) can significantly decrease the generation of saliva or blood contaminated aerosols.

Pharmaceutical therapy, comprising antibiotics and analgesics, is recommended for patients suspected for COVID- 19 who are detected during the screening process to reduce their symptoms to some extent. And likewise therapeutic interventions should be postponed until recovery. It should be noted that pharmaceutical therapy should be based on the most recent, updated information to use safer medications.

Role of digital dentistry in covid

There have been great advancements been made in digital dentistry in the recent years specially in restorative dentistry. The use of digital intraoral impressions ease the need for use of an impression tray or dental impression materials

which reduces risk of gag reflex and coughing of patient. Digital impressions also eliminate the risk of contact with contaminated trays and minimize the risk of infection transmission and cross- contamination and decrease the number of treatment sessions, which also lowers the risk of contracting a disease. A new restoration can be easily fabricated for such patients within one session with minimal contact with the patient or even by using the previous scan of the patient, if available.

The recent technological advances also led to the advent of robotic dentistry, which has greatly advanced in different fields such as endo micro robot, surgical robot, and robotic dental drilling. Some concerns still exist regarding the efficacy of digital technology to offer customized treatments based on individual patient needs. However, it appears to be very promising for future use in certain circumstances such as global pandemics of infectious diseases.

Thus, occurrence of events such as the COVID- 19 outbreak encouraged the dental researchers to focus on novel dental approaches. This can be done by benefitting from the other fields of science to come up with some strategies to provide dental care under such circumstances and minimize the impact of such occurrences on dental care of patients.

IV. CONCLUSION

It is quite unusual that a single virus may lead to such a wide polymorphism of skin patterns. A possible explanation may be that some are associated with SARS- CoV- 2 infection and have alternative causes. The similarity between some of the lesions observed in COVID- 19 and other viral infections results in the hypothesis that some of these might be the result of co- infection. Skin manifestations are largely associated with the preventive measures adapted for the virus. There are also suggestive reports of various infections which are caused due to virus or its associating variants. Furthermore, patients with COVID- 19 are more likely to develop adverse drug reactions. Therefore, it is essential to identify clues supporting either viral cause or drug eruption to allow the early recognition of cutaneous manifestations associated with severe complications.

Dental association of patient management deals from admission to completion of treatment. The emergency cases should be detected via a primary interview over the phone or online followed by the division of patients as apparently healthy, suspected for COVID- 19, and confirmed



for COVID- 19, by screening questionnaires for COVID- 19. Separate waiting and operating rooms should be assigned to to minimize the risk of disease transmission. Moreover, the same protective measures with regard to PPE for the dental clinicians and staff should be considered for all groups. The type of dental treatment to be given should also be considered as aerosols and high pressure aerators need to be avoided.

[11]. Chen C, Willeke K. Aerosol penetration through surgical masks. *Am J infect Control.* 1992;20(4):177–184.

REFERENCES

- [1]. Guan WJ, Ni ZY, Hu Y, et al. Clinical characteristics of Coronavirus Disease 2019 in China. *N Engl J Med.* 2020; 382(18):1708- 1720.
- [2]. Rothan H. A., Byrareddy S. N. The epidemiology and pathogenesis of coronavirus disease outbreak. *Journal of Autoimmunity.* 2020; 109.
- [3]. Recalcati S. Cutaneous manifestations in COVID- 19: a first perspective. *J Eur Acad Dermatol Venereol.* 2020; 34(5):e212- e213.
- [4]. Lan J., Song Z., Miao X., et al. Skin damage among health care workers managing coronavirus disease-2019. *Journal of the American Academy of Dermatology.* 2020; 82(5):1215–1216.
- [5]. Suchonwanit P, Leerunyakul K, Kositkuljorn C. Cutaneous manifestations in COVID- 19: Lessons learned from current evidence. *J Am Acad Dermatol.* 2020;83(1):e57- e60
- [6]. Kaya G., Kaya A., Saurat J.-H. Clinical and histopathological features and potential pathological mechanisms of skin lesions in COVID-19: review of the literature. *Dermatopathology.* 2020;7(1):3– 16.
- [7]. Gül Ü. COVID-19 and dermatology. *Turk J Med Sci.* 2020 Dec 17;50(8):1751-1759.
- [8]. Villani, F. A., Aiuto, R., Paglia, L., & Re, D. (2020). COVID-19 and Dentistry: Prevention in Dental Practice, a Literature Review. *International journal of environmental research and public health.* 17(12), 4609.
- [9]. Ghani F. Covid-19 Outbreak - Immediate and long-term impacts on the dental profession. *Pak J Med Sci.* 2020 May; S126-S129.
- [10]. Meng L, Hua F, Bian Z. Coronavirus Disease 2019 (COVID-19):Emerging and Future Challenges for Dental and Oral Medicine. *J Dent Res.* 2020 doi:10.1177/0022034.