Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/1hqdhj61

BIOLOGY OF ORAL MUCOSA AND COVID-19

Dr. Farhan Dil[1], Dr. Asma Ali[2*], Dr. Rozi Afsar[3], Dr. Momena Rashid[4], Dr. Arbab Zia ur Rehman[5], Dr. Syed Amjad Abbas[6], Marwa Kakakhel[7]

[1]Assistant Professor, Oral Biology, Khyber College of Dentistry, Peshawar, Pakistan
[2*]Associate Professor, Oral Biology. Bacha khan College of Dentistry, Sheikh Maltoon Town, Mardan
[3]Assistant Professor, Oral Biology, Saidu College of Dentistry, Allah Chowk Saidu, Swat, Pakistan
[4]Assistant Professor, Oral Biology Rehman College of Dentistry, Peshawar, Pakistan
[5]Associate Professor, Oral Biology, HBS Dental College and Hospital, Taramri, Islamabad, Pakistan
[6]Assistant Professor, Oral Pathology, Rehman College of Dentistry, Peshawar, Pakistan
[7]BDS, Student, Rehman college of Dentistry, Hayatabad Peshawar, Pakistan

***Corresponding Author:** Dr. Asma Ali
*****Email: khan_hoti@hotmail.com

ABSTRACT

Objective: The study aimed to evaluate the association of COVID-19 with oral mucosal lesions.
Methodology: 'This descriptive study was conducted in the Department of Medicine at Rehman College of Dentistry Rehman Medical Institute, Peshawar, from August 15, 2022, to February 15, 2023'. Two hundred patients of both genders between the ages of 18 and 60 were examined for oral mucosal lesions. The site and type of these lesions were recorded. The data was analyzed using 'SPSS software (version 21)'. A Chi-square test was performed to compare differences between genders.
Results: Out of 200 patients (N=200), '69 females (34.5%) and 131 males (65.5%)'. The mean age was 52.8 years (range: 31–68, SD: 6.9). Oral mucosal lesions were present in 159 (79.5%) cases.. Most were apthous-like ulcers (n=73, 45.91%) with a tongue as their common site (n=63, 39.62%). Most of these lesions were present in males, and the results were statistically significant (P<0.05).
Conclusion: Oral lesions are a common symptom of COVID-19 and are influenced by viral replication in oral tissues. The tongue buccal mucosa and palate are the preferred sites for these lesions.

Keywords: COVID-19, oral lesions, apthous ulcers, lichen planus, erythema, tongue

INTRODUCTION

The world was stormed by 'coronavirus disease 2019(COVID-19) due to severe acute respiratory syndrome coronavirus 2 (SARS COV-2)' [1]. This disease mostly attacks the respiratory system of patients, resulting in acute respiratory distress. The oxygen perfusion of the patient becomes low as the alveoli in the lungs are filled with fluid[2]. The blood becomes coagulated, and other vital organs are also affected, resulting in severe damage to different organ systems of the body, sometimes resulting in death[3]. Patients exhibit sore throat, high-grade fever, cough, vomiting, and shortness of breath. 'The virus enters vital organs through angiotensin-converting enzyme receptor 2(ACE 2)'. It even enters the dermal vessels and epithelial surfaces of glands[4]. Apart from systemic manifestation,

various skin lesions have been described in the literature, attributed to COVID -19 [5]. The oral cavity also has ACE 2 receptors, various mucosal lesions, and conditions such as dysgeusia, reported in more than 38% of patients and described in the literature[6]. Other studies have described a high prevalence of oral lesions in the different areas of the oral cavity in different parts of the world[7].
Investigating the association between oral mucosal lesions and COVID-19 will help understand this disease. It primarily 'affects the respiratory system, but there is increasing evidence that it can also affect the oral cavity, resulting in oral lesions'. By studying these manifestations, we can not only gain insight into diverse ways in which the virus affects the human body, but also this can help us in the early detection of COVID-19, resulting in early intervention and treatment. The study's objective was to evaluate the association of COVID-19 with oral mucosal lesions.

METHODOLOGY

'This descriptive study was conducted in the Department of Medicine at Rehman College of Dentistry, Rehman Medical Institute, Peshawar, following ethical approval from the review board'. It was carried out from August 15, 2022, to February 15, 2023.
After obtaining consent, 200 'patients of both genders aged 18 and above were included using a consecutive sampling technique'. Exclusion criteria included patients without a laboratory-confirmed COVID-19 diagnosis, those with pre-existing oral lesions, and individuals with oral pathologies or neurodegenerative diseases.
The sample size was calculated using G*Power software (version 3.1.9.4) with a 'p-value of 0.05, medium power (0.3), and a 95.1% confidence level'. A preformed proforma was used to record data, including age, gender, type of lesion, and its features, i.e., size, shape, and number.
The World Health Organization's (WHO) eight-step intraoral examination collected data on oral lesions [8.] Personal protective measures included 'wearing long-sleeved fluid-resistant gowns, gloves, N95 masks, protective eyewear, and face shields'. 'All instruments were sterilized to reduce the risk of transmission. Personal protective measures included wearing long-sleeved fluid-resistant gowns, gloves, N95 masks, protective eyewear, and face shields'. All instruments were sterilized to reduce the risk of transmission. The data was analyzed using 'SPSS (version 21), and the Chi-square test was used to compare male and female groups'. A P value of less than 0.05 was considered significant.

RESULTS

Out of 200 patients (n=200), 69 were females (34.5%) and 131 males (65.5%), with a mean age of 52.8, ranging from 31 to 68 years, and an SD of 6.9 'years (Table 1)'.
A total of 200 patients participated in the study, with 159 (79.5%) presenting with oral lesions (Table 2). Most of these lesions were on the tongue (n=63, 39.62%), followed by buccal mucosa, gingiva, and palate. Most were apthous-like ulcers (n=73, 45.91%), followed by erythema and lichen planus-like lesions (table III, figure 1). Most of these lesions were present in males, and 'the results were statistically significant($P<0.05$)'.

Table 1: Distribution of Age and Gender

Variable	**Value**
Age Range	31–68 years
Mean Age	52.8 years (± 6.9)
Gender	
Male	133 (66.5%)
Female	67 (33.5%)

Table II: Presence of oral lesions and their gender-wise distribution

Oral lesions	Male	Female	Total	Chi-square value	P-value
Present	123(92.48%)	36(22.64%)	159(79.5%)	13.28	0.01
Absent	10(7.52%)	31(77.36%)	41(20.5%)		
Total	133	67	200		

Table III: Site and type of oral lesions

Site	Apthous like ulcers	Erythema	Lichen planus Like lesions	Total
Tongue	31(49.20%)	22(34.92%)	10(15.87%)	63(39.62%)
Buccal mucosa	26(47.27%)	17(30.90%)	12(21.81%)	55(34.59%)
Gingiva	11(35.48%)	10(32.25%)	10(32.25%)	31(19.49%)
Palate	5(50%)	2(20%)	3(30%)	10(6.2%)
Total	73(45.91%)	51(32.07%)	35(22.01%)	159

Figure 1: appearance of oral lesions in COVID-19 patients.

DISCUSSION

COVID-19 is a viral infection that attacks different organ systems with variable complications[9]. Although it mainly attacks the respiratory system, it also has oral manifestations. As the oral cavity is mostly not examined in COVID-19 patients because of fear of cross-infection, the prevalence of oral lesions is still unknown[10]. The prevalence of oral lesions in different studies varies from 51.4% to 81.3%. Our study also found it very high (79.5%) [11]. The exact reasons for the higher prevalence of oral lesions are unknown, but this can be due to viral replication in oral cells, immune response, secondary infections, and underlying health conditions[12].

The current study has seen a higher prevalence of oral lesions in male patients, which is in accordance with other studies done worldwide[13]. The exact cause of these observed gender differences in the prevalence of oral lesions is not fully known, but they could be influenced by various factors such as immune response, underlying health conditions, and oral hygiene practices[13]. Chaus Bodard et al. were the first to describe oral lesions associated with this disease[14]. In their study, the most frequent lesion to be detected were aphthous type ulcers(54.1%). These ulcers tended to merge into large necrotic areas. In our study the most frequent type of oral lesions were also found to be apthous like ulcers. In their study, Gianotti et al. described COVID lesions ranging from mild damage to the epithelial layer to vasculitis and extravasation of red blood cells[15]. Scientists have postulated that this virus damages the epithelium, resulting in ulcer formation and, later, in vasculitis, causing large necrotic areas to be formed[16].

Wu YH et al. described erythema and lichen planus-type lesions as prevalent in COVID-19 patients[17]. Lichen planus is an immune-mediated T-cell response that mostly affects old women[18].

Our study found erythema and lichen planus-type lesions to be 32.07% and 22.01%. These results are in general accordance with other studies done worldwide19. Viruses can easily enter cells with ACE2 receptors and result in inflammation. Hence, cells with ACE2 receptors may enhance inflammation in associated tissues such as oral mucosa, resulting in different oral manifestations such as erythema and lichen planus-like lesions[20].

Brandão TB et al. identified 'the tongue as the most common site for oral lesions in COVID-19 patients, followed by the buccal mucosa and palate' [21]. Our study also identified the tongue as the most frequently affected site for oral lesions. There is no definitive evidence to support the tongue as the preferred site for oral lesions in such patients, and different studies are underway to fully investigate and understand this disease's oral manifestations.

Limitations

A larger sample size was needed to obtain more representative results. Other systemic conditions and medications can result in oral lesions, which must be considered before studying such lesions. Results can also alter during the course of the disease and during follow-up, which might affect the long-term understanding of COVID-19.

CONCLUSION

Oral lesions are a common symptom of COVID-19 and are influenced by viral replication in oral tissues. The tongue buccal mucosa and palate are the preferred sites for these lesions.

REFERENCES

1. Iranmanesh B, Khalili M, Amiri R, Zartab H, Aflatoonian M. Oral manifestations of COVID-19 disease: A review article. Derm Therap. 2021;34(1):e14578-81.
2. Fidan V, Koyuncu H, Akin O. Oral lesions in Covid-19 positive patients. Am J Otolaryngol.. 2021;42(3):102905-8.
3. Egido-Moreno S, Valls-Roca-Umbert J, Jané-Salas E, López-López J, Estrugo-Devesa A. COVID-19 and oral lesions, short communication, and review. J Clin Exp Dent. 2021;13(3):e287-90.
4. Di Spirito F, Iandolo A, Amato A, Caggiano M, Raimondo A, Lembo S *et al.* Prevalence, features and degree of association of oral lesions in COVID-19: A systematic review of systematic reviews. IJERPH. 2022;19(12):7486-9.
5. Dos Santos JA, Normando AG, da Silva RL, De Paula RM, Cembranel AC, Santos-Silva AR, Guerra EN. Oral mucosal lesions in a COVID-19 patient: new signs or secondary manifestations? I J Infec Dis. 2020;97:326-8.
6. Favia G, Tempesta A, Barile G, Brienza N, Capodiferro S, Vestito MC *et al.* COVID-19 symptomatic patients with oral lesions: a clinical and histopathological study on 123 cases of the University Hospital Policlinic of Bari with a purpose of a new classification. J Clin Med. 2021;10(4):757-9.
7. Petrescu N, Lucaciu O, Roman A. Oral mucosa lesions in COVID-19. Oral dis. 2020;28(1):935-936
8. Farid H, Khan M, Jamal S, Ghafoor R. Oral manifestations of Covid-19-A literature review. Rev med virol. 2022;32(1):e2248-51.
9. de Sousa FA, Paradella TC. Considerations on oral manifestations of COVID-19. J med virol. 2021;93(2):667-9.
10. Di Spirito F, Caggiano M, Di Palo MP, Contaldo M, D'Ambrosio F, Martina S *et al.*. Oral Lesions in Pediatric Subjects: SARS-CoV-2 Infection and COVID-19 Vaccination. Appl Sci. 2022;12(18):8995-7.
11. Kitakawa D, Cabral LA. Oral lesions of herpes zoster in COVID-19 patients or truly associated to the disease? Oral Dis. 2020;27:774-5.
12. Rodríguez MD, Romera AJ, Villarroel M. Oral manifestations associated with COVID-19. Oral dis. 2022;28(1):960-63.

13. Rocha BA, Souto GR, Grossmann SD, de Aguiar MC, de Andrade BA, Romañach MJ *et al.* Viral enanthema in oral mucosa: a possible diagnostic challenge in the COVID-19 pandemic. Oral Dis. 2020;27(3):776-778
14. Chaux-Bodard AG, Deneuve S, Desoutter A. Oral manifestation of Covid-19 as an inaugural symptom?. J Oral Med Oral Surg. 2020;26(2):18-21.
15. Sachdeva M, Gianotti R, Shah M, Bradanini L, Tosi D, Veraldi S *et al.* Cutaneous manifestations of COVID-19: Report of three cases and a review of literature. J Derm Sci. 2020;98(2):75-81.
16. Maciel PP, Martelli Júnior H, Martelli DR, Machado RA, Andrade PV, Perez DE *et al.* Covid-19 pandemic: Oral repercussions and its possible impact on oral health. Pesqui Bras Odontopediatria Clin Integr . 2020;20:doi.org/10.1590/pboci.2020.135
17. Wu YH, Wu YC, Lang MJ, Lee YP, Jin YT, Chiang CP. Review of oral ulcerative lesions in COVID-19 patients: A comprehensive study of 51 cases. J Dent Sci. 2021;16(4):1066-73.
18. Ganesan A, Kumar S, Kaur A, Chaudhry K, Kumar P, Dutt N *et al.* Oral manifestations of COVID-19 infection: an analytical cross-sectional study. JOMS.2022;21(4):1326-35.
19. Thongprasom K, Pengpis N, Phattarataratip E, Samaranayake L. Oral pemphigus after COVID-19 vaccination. Oral Dis. 2021;2:2597-2598
20. Machado RA, de Souza NL, Oliveira RM, Júnior HM, Bonan PR. Social media and telemedicine for oral diagnosis and counselling in the COVID-19 era. Oral oncol. 2020;105:104685-6.
21. Brandão TB, Gueiros LA, Melo TS, Prado-Ribeiro AC, Nesrallah AC, Prado GV *et al.* Oral lesions in patients with SARS-CoV-2 infection: could the oral cavity be a target organ?. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2021;131(2):e45-51.