Patients who tested positive for COVID-19 by rapid test and their oral clinical characteristics

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Abstract: Introduction: The pandemic caused by SARS-CoV-2 infection is associated with variable oral clinical manifestations, ranging from mild or almost nonexistent symptoms to fatal complications.

Objective: To describe the oral clinical manifestations in patients with a positive rapid test for COVID-19.

Methods: An observational, descriptive, and cross-sectional study was conducted on 54 patients with a positive rapid test for COVID-19 who presented with oral clinical manifestations. These patients were treated at the Emergency Respiratory Diseases Service of the José Martí Teaching Polyclinic in Santiago de Cuba from January to August 2021. Variables analyzed included the presence or absence of symptoms, their type, location, and time of onset. Absolute and relative frequencies were used as summary measures.

Results: Symptomatic patients predominated in the series (75.9%); diffuse erythema was the most frequent lesion (14.8%), and xerostomia was the only manifestation among asymptomatic patients. It is worth noting that most oral clinical manifestations were present before the onset of general symptoms (63.4%).

Conclusions: Oral clinical manifestations were confirmed in patients with a positive rapid test for COVID-19.

Key words: covid-19; test of quick diagnosis; oral clinical manifestations

1 Introduction

COVID-19 is the disease caused by the SARS-CoV-2 coronavirus, which has an estimated incubation period of 1–14 days and is transmitted through direct contact. During January and February 2020, cases were reported in several regions of China before spreading to other Asian countries and other continents. In March 2020, the World Health Organization (WHO) officially declared it a pandemic [1,2].

According to the Cuban Ministry of Public Health [3], there were 760,360,956 confirmed cases of COVID-19 and 6,873,477 deaths worldwide. In the Americas, there were 190,933,060 confirmed cases and 2,936,859 deaths. In Cuba, as of March 25, 2023, there were 1,112,778 cases and 8,530 deaths. Currently, sporadic cases are being reported in Santiago de Cuba, with no fatalities.

The polymerase chain reaction (PCR) test is available for identifying SARS-CoV-2 [4], and is considered the gold standard for molecular diagnosis. Despite the effectiveness of this technique, there is a need to include rapid tests that

detect structural components of the virus, such as S and N proteins, present during early stages of infection in nasopharyngeal secretion samples [5].

In Cuba, the rapid test was used for the early diagnosis of COVID-19 as an alternative in laboratories with limited resources or that lacked the PCR test, which could also be part of a protocol for population studies.

Although in many dental clinics in various regions only dental emergencies were prioritized, Cuban dentists also carried out investigations and worked as paramedics in the emergency services enabled in polyclinics and hospitals in response to the health emergency; hence the need to know how to identify this new disease taking into account the oral clinical manifestations.

As described, the clinical symptoms of COVID-19 are heterogeneous, ranging from mild or almost nonexistent to fatal complications such as respiratory distress, septic shock, and multiple organ failure. Similarly, initial symptoms are often variable and include fever, muscle pain, as well as taste and respiratory disturbances (dry cough, nasal congestion, and dyspnea, among others) [6].

Oral clinical manifestations that may indicate the presence of the disease also appear, such as xerostomia, desquamative gingivitis, petechiae and some opportunistic infections such as candidiasis [7], so confirmatory examinations are carried out.

Many works have been published [2,5,6] on the oral symptoms associated with this infectious disease and, specifically, professionals in stomatology have carried out numerous literature reviews on the subject [1,7,8,9].

Although the rapid test only allows for a presumptive diagnosis, since it is performed on patients suspected of having COVID-19, studies on oral manifestations in positive cases are scarce, especially those carried out by dentists, the ones who truly know about it.

Given that this is a disease about which little is known, the authors were motivated to carry out the present research with a view to describing the oral clinical symptoms in patients with a positive rapid test for covid-19.

2 Methods

An observational, descriptive, and cross-sectional study was conducted on 54 patients with a positive rapid test for COVID-19, who presented oral clinical manifestations, treated at the Emergency Respiratory Diseases Service of the José Martí Teaching Polyclinic in Santiago de Cuba during the period January-August 2021.

The variables analyzed were obtained through questioning and clinical examination, which included: oral symptoms (present or absent), type, time of appearance (before or during the appearance of clinical symptoms) and location of the lesions (according to their topographic location).

All the information obtained was processed using the SPSS statistical system, version 25.0. The summary measures used were absolute and relative percentage frequencies.

The Chi-square test of independence (X^2) was applied with a significance level of $\alpha = 0.05$, which represents the existence of differences beyond chance by the associated probability value (p).

An initial interview was held with all patients who were part of the study and their legal representatives, where they were informed about what their participation consisted of and that the data obtained would only be used for research purposes.

3 Results

Of the total number of patients (Table 1), 41, or 75.9%, were symptomatic and 24.1% presented oral clinical manifestations, but did not have general symptoms due to the infectious process.

Table 1. Patients according to the presence of clinical manifestations

Presence of oral clinical manifestations	No.	%
With symptoms	41	75,9
No symptoms	13	24,1
Total	54	100,0

Table 2 shows that diffuse erythema was the most frequent lesion (8, for 14.8%) and that the only oral manifestation present among the asymptomatic was xerostomia (7.4%).

Table 2. Patient according to types of oral symptoms

Type of oral symptoms	No.	%
Diffuse erythema	8	14,8
Vesiculopapular lesions	5	9,2
Xerostomia	4	7,4
Whitish patches	3	5,5
Hyposalivation	2	3,7
Hypertrophic lingual papillae	1	1,8
depapillated tongue	1	1,8

As shown in Table 3, the lesions predominated in the buccal mucosa (45.0%) and in the oropharynx (40.0%), related to the appearance of prevalent oral clinical symptoms.

Table 3. Location of oral clinical manifestations

Location	Oral clinical manifestations							
	Vesiculopapular lesions		Whitish patches		Diffuse erythema		Total	
	No.	%*	No.	%*	No.	%*	No.	%*
Buccal mucosa	6	30	2	10	1	5	17	45,0
Oropharynx	2	10			6	30	8	40,0
Floor of the mouth	2	10					2	10,0
Tongue	1	5	1	5			2	10,0
Gums	1	5					1	5,0

*Percentages calculated based on the total number of oral clinical manifestations.

Most oral clinical manifestations (26 patients, for 63.4%) were present before the symptoms of the disease and in 22 appeared later (53.7%).

4 Discussion

With the emergence of COVID-19, tests were implemented to save time and lives, leading to a high level of suspicion and confirmation of the disease. Unlike the PCR test, which detects proteins and antibodies produced against the virus [2], the rapid diagnostic test using nasopharyngeal swabs does not identify the virus's RNA, but it indicates in 10 to 15 minutes whether a person is infected or not. This proved invaluable during the critical moments of the pandemic, given the number

of cases. While a positive result was not specific for COVID-19, a negative result did not necessarily indicate the absence of the disease.

Theoretically, the viral antigen is a specific marker of the virus and precedes the appearance of antibodies in infected patients, so its detection can serve as a rapid and less expensive test for early diagnosis [5]. Therefore, they were unreliable and did not identify symptoms of the disease, since there were asymptomatic patients who later reported clinical manifestations and the disease was subsequently confirmed by PCR.

During the epidemic, Cuban dentists had to join the efforts to combat the pandemic. Among the tasks they performed was participation in the rapid response team where testing was conducted, which exposed them to infection. In this context, it was essential to recognize the clinical symptoms of the disease and reinforce protective measures, as many of these professionals transported suspected patients to isolation centers and provided care in emergency dental clinics.

Furthermore, the general manifestations of COVID-19 can be pulmonary and extrapulmonary. It is a lower respiratory tract infection, meaning that most symptoms are felt in the chest and lungs [5], but it is associated with other typical symptoms, namely: fever, dry cough, cough with sputum or phlegm, dyspnea, bone and joint pain, sore throat and headache, chills, nausea, vomiting, nasal congestion, diarrhea, coughing up blood, and swollen eyes [10].

Oral symptoms are among the extrapulmonary symptoms. In the current series, most of these were already present before the onset of the general clinical symptoms that suggested SARS-CoV-2 infection.

Based on our analysis, the presence of oral lesions in symptomatic patients with a positive rapid test suggests confirmation of the disease.

Similarly, authors such as Iranmanesh et al. [11] consider the presence of these lesions a warning sign of COVID-19 and identified dysgeusia as the most recognized symptom in infected symptomatic patients. It should be noted that in individuals with more severe complications, oral lesions are more widespread and serious.

In accordance with what was found in this case series, Pino et al [12] described a case in Villa Clara that 72 hours before the systemic manifestations appeared already presented lesions in the mouth.

The virus that causes COVID-19 was identified in the saliva of infected patients; therefore, transmission occurs through respiratory droplets (Flügge droplets) when a patient coughs, sneezes, or speaks loudly. These were the main routes of transmission to which dentists were exposed during emergency consultations.

Oral clinical manifestations can appear with or without general symptoms. In line with this, the present study observed that these manifestations were more frequent than the number of cases, as more than one coexisted in a single patient. A similar finding was observed among symptomatic patients with positive rapid tests, although it differed in relation to xerostomia, which was the only manifestation among asymptomatic individuals. This could mean that when oral manifestations are associated with clinical signs of the disease, as found during this study, the suspicion of COVID-19 is higher, but not when they are the sole manifestation.

Carreras et al. [1] assert in their study that 13.67% of individuals with confirmed infection exhibited vesicular or blister-like lesions in the oral cavity; data similar to those presented in this investigation. In this regard, Muñoz et al. [9)] observed aphthous lesions without necrosis in younger patients with mild infection, as well as aphthous lesions with necrosis and hemorrhagic crusts in older individuals with immunosuppression and severe infection. The regression of these lesions was associated with the improvement of the systemic disease.

In their investigation, Parra et al. [13] found the predominance of lesions in the masticatory mucosa (31.3%), in the lining mucosa (28.1%) and in the tongue (15.6%); while the most frequent type corresponded to ulcers in the oral mucosa

(28.6%), which coincided with that reported by Calero et al [14], but differed in terms of location, since the most relevant site was the cheek, with a predominance of diffuse erythema.

Capocasale et al.[15], in a review that included 23 articles, found 3 different oral manifestations: altered taste, blisters and ulcers, as well as lesions associated with Kawasaki-like diseases (erythema, lip bleeding and the so-called "strawberry tongue"). These authors concluded that the greater expression of angiotensin-converting enzyme 2 (ACE2) in the oral cavity and in endothelial cells could be related to these effects and to the higher reporting of COVID-19 symptoms in Western countries.

A descriptive and cross-sectional study of 27 patients with COVID-19 carried out in Las Tunas revealed that 66.7% of the sample presented oral manifestations, among which the burning and painful sensation of the oropharyngeal region (40.7%) and xerostomia (29.6%) stood out; a finding that coincides with that obtained in this case series [16].

During the incubation period of infectious diseases, whether bacterial or viral, patients may appear healthy; however, the appearance and intensity of symptoms in the acute period of the disease will be related to the patient's immune status, the presence of underlying diseases, and the virulence of the microorganism.

It is worth noting that many of these clinical manifestations can occur in the oral cavity and hygiene plays an important role [17]. This may explain why there is no relationship between the appearance of oral and general symptoms, as this depends on the patient's behavior.

COVID-19 has left sequelae in the oral cavity. It is believed that the virus may have the ability to infect taste receptor cells, the cranial nerves that allow the perception of taste and chemosthetic information, or even infect surrounding blood vessels and cells of the central nervous system [18]. Similarly, SARS-CoV-2 has an affinity for ACE2 receptors, so it can infect keratinocytes of the tongue, but the mechanism by which it affects the senses is not entirely clear; however, it is possible that these alterations do not occur together, since they have different peripheral and central neural mechanisms [18]. In this sense, it is proposed that ACE2 is found in large quantities in the lining epithelium of the oral cavity and in the specialized tissue of the tongue; hence, the antral cavity is the site of expression of the oral symptoms and lesions produced by this virus, as well as the immunological deterioration it produces with its repercussions in the mouth [19].

The authors of this research infer that oral manifestations without symptoms of COVID-19 may constitute warning signs of the presence of the virus; therefore, despite epidemiological control, dentists should take them into account during comprehensive patient care, with a view to detecting the disease early.

This research had certain limitations, as the results are limited to one area and respiratory emergency room and only suspected patients were chosen, so it is necessary to extend the study to other health areas and include confirmed cases of covid-19.

Oral clinical symptoms were observed in patients with positive rapid COVID-19 tests, possibly associated with the presence or absence of disease symptoms. This study is recommended to further investigate the potential impact on improving the quality of life for both patients and dental staff.

Conflicts of interest

The author declares no conflicts of interest regarding the publication of this paper.

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Authors' Contributions

Lidia Beatriz Caraballo Villalón: conceptualization, data curation, formal analysis, research, resources, writing, revision, and editing. Contribution: 40%.

Cristina Perdomo Estrada: project management, resources, supervision, writing, revision, and editing. Contribution: 25%.

Prudencia Villalón Artires: formal analysis, writing, supervision, revision, and editing. Contribution: 15%.

Leonor Peralta Agramonte: formal analysis, writing, and revision. Contribution: 10%.

Alejandro David Fernández Gómez: writing, supervision, and revision. Contribution: 10%.