Oral Antiseptic Spray Containing Phthalocyanine Solution Reduced Saliva SARS-CoV-2 Viral Load: Case Series

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Introduction

Since the 2019 global dissemination of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), scientific advancements have enabled researchers to develop different types of vaccines and other forms of prevention and treatment against coronavirus disease 2019 (COVID-19).[1] The oral cavity is related to the development of COVID-19 as it allows the virus direct access into the body.[2–4] According to the literature, clinical evidence has demonstrated that antiviral oral solutions can inactivate SARS-CoV-2 and reduce clinical symptoms and severity of COVID-19.[2,5–8] Based on previous in vitro studies employing antiviral phthalocyanine derivative (APD) solutions,[6,9] this case series evaluated the action of an APD oral spray for viral load reduction in COVID-19 hospitalized patients.

Material and Methods

This prospective, single center, and consecutive case series study was conducted at a public hospital in Brazil, in accordance with the principles of the declaration of Helsinki and the ethical standards of human experimentation, with the approval of the human research ethics committee (CAAE 34070620.6.0000.5417). From November 1, 2020, to January 14, 2021, COVID-19 patients diagnosed by real-time reverse transcriptase-polymerase chain reaction (PCR) and admitted to the hospital were invited to participate. To be enrolled in the study, participants had to be 18 years or older and present with SARS for more than a week prior to admission. Participants signed an informed consent form after agreeing to the risks and objectives of the study. The exclusion criteria included patients who had medical contraindications to oral spray, an inability to gargle/spit, and a baseline negative salivary PCR for the presence of SARS-CoV-2. Patients were instructed to use $\sim$ 1.5 mL of the APD solution (3 pumps for each area: throat, tongue, right cheek, and left cheek), switch between gargling/rinsing for 30 seconds, and conduct this regimen 5 times per day: upon awakening, after breakfast, after lunch, after dinner, and before bedtime. This adjunctive protocol was performed for 1 week along with

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standard COVID-19 treatment. Saliva was collected to evaluate the presence of SARS-CoV-2 (PCR) before initiation of the oral spray protocol (baseline), and again after 2 and 4 days of use.

Results

A sample of 11 patients from 14 selected SARS-CoV-2-positive patients was enrolled in this study. According to ►**Table 1**, 10 patients (91%) were male, and the median age was 58 years (range: 38–77 years). The median onset of symptoms was 5 days before admission, with a 5-day median length of hospital stay. Four patients (36.4%) had no comorbidities, and 1 patient (9%) was admitted to the intensive care unit and subsequently passed. All patients received standard care for COVID-19, including antibiotic, antiinflammatory, anticoagulation, and oxygen support therapy. Regarding salivary SARS-CoV-2 detection, 6 patients (54.5%) tested positive, and 5 patients (45.5%) tested negative after 2 days. After 4 days of APD oral spray use, 3 patients (27.3%) tested positive, and 8 (72.7%) tested negative. No side effects of using an APD oral spray have been reported.

Discussion

In the present case series, the use of an APD oral spray protocol reduced the salivary SARS-CoV-2 viral load in COVID-19 hospitalized patients. According to the literature,[2–4] the oral environment is directly involved in the pathophysiology of COVID-19.

Severe acute respiratory syndrome coronavirus 2 can replicate in the oral mucosa and be transmitted by saliva. Oral antiviral solutions can reduce the viral load in saliva and decrease the spread of the virus. Our previous study[6] demonstrated clinical improvement and reduction in hospitalization time (4-day median length of hospital stay) when an APD oral solution was used as an adjuvant in a gargle/rinse mouthwash protocol in COVID-19 patients. In the present study, 91% of patients were discharged from the hospital with a 5-day median length of hospital stay. Thus, we hypothesized that the APD oral spray protocol plays a role in faster recovery without any side effects.

Considering the limitations of the present case series, the lack of a comparative placebo control and sample size may have influenced our interpretation of the results. However, the use of APD showed that 45.5% and 72.7% of the samples were PCR-negative for SARS-CoV2 after 2 and 4 days, respectively. Similar results were reported in a chlorhexidine oropharyngeal rinse-treated group (62.1%) and a combined chlorhexidine oropharyngeal rinse and posterior oropharyngeal spray-treated group (86%) after 4 days.[10]

Simple and low-cost measures, such as the use of antiviral substances in mouthwashes and mouth sprays, may accelerate COVID-19 recovery, thus reducing the progression of severe, life-threatening cases of the disease.

Conclusion

Considering the limitations of this case series, the results suggest that the use of an APD oral spray may reduce the salivary SARS-Cov-2 viral load. Further randomized controlled clinical trials with larger sample sizes using this protocol are necessary.

Table 1 Case series: patients data and clinical characteristics

Patient no.	Age	Sex	Outcome	ICU need	Symptoms onset	Hospitalization time	PCR baseline	PCR D2	PCR D4	Underlying diseases
1	38	M	discharge	no	5	4	positive	negative	discharge	obesity
2	58	M	discharge	no	5	3	positive	negative	discharge	no comorbities
3	61	M	discharge	no	5	3	positive	negative	discharge	no comorbities
4	42	M	discharge	no	6	3	positive	negative	discharge	obesity, arterial hypertension
5	60	M	discharge	no	6	8	positive	negative	negative	no comorbities
6	48	W	discharge	no	5	5	positive	positive	negative	obesity, arterial hypertension, asthma, anemia
7	67	M	discharge	no	5	26	positive	positive	negative	arterial hypertension, smoking, glaucoma
8	55	M	discharge	no	3	5	positive	positive	negative	coronary heart disease
9	50	M	discharge	no	3	5	positive	positive	positive	no comorbities
10	65	M	discharge	no	3	12	positive	positive	positive	arterial hypertension, coronary heart disease
11	77	M	death	yes	5	22	positive	positive	positive	serious coronary heart disease, arterial hypertension, chronic renal failure, diabetes, former smoker, arterial hypertension, alcoholism

Abbreviations: ICU, intensive care unit; M, male; PCR, polymerase chain reaction; W, woman.

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Conflict of Interests
The authors have no conflict of interests to declare.

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