Use of povidone as a mouthrinse to decrease the viral load of Covid-19 before dental care: Review of the literature

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ABSTRACT: Purpose: To review the literature on the use of povidone prior to dental treatment for the reduction of viruses in the oral cavity. Methods: PubMed and Cochrane databases published from January 2019 to June 2020 were reviewed. Studies that met the inclusion criteria were reviewed by two authors separately. A qualitative review of the data was performed. Results: There were no randomized controlled trials or clinical observation studies on the curative or preventive effect of povidone against COVID-19, but there are clinical trial protocols in the recruitment process. The use of a dose between 0.2% to 2.5% is recommended four times a day for 15-30 seconds. (Am J Dent 2020;33:248-250).

CLINICAL SIGNIFICANCE: Povidone mouthwash could be a viable solution before dental care that should be studied to reduce the viral load off COVID-19.

Introduction

As viral load appears highest in the nasopharynx, and high in human saliva, these anatomical areas likely seed the lower airway and serve as one of the main reservoirs for aerosolized transmission and progression of pulmonary disease. Furthermore, viral loads of asymptomatic and symptomatic patients are similar, suggesting the transmission potential of asymptomatic/minimally symptomatic patients.1

The use of antiseptic rinses prior to dental care would favor the reduction of the virus in the oral cavity. Various biocidal agents can inactivate SARS-CoV and MERS-CoV effectively; these are ethanol (ethyl alcohol) 78-95% for 30 seconds, 2-propanol (isopropyl alcohol) 70-100% for 30 seconds, formaldehyde 0.7-1% for 2 minutes, povidone iodine 0.23-7.5% for 1 minute. Glutaraldehyde 2.5% for 5 minutes or 0.5% for 2 minutes inactivates SARS-CoV, but no study has been published with MERS-CoV. Sodium hypochlorite requires a minimum concentration of 0.21% for 30 seconds to be effective, and hydrogen peroxide at a concentration of 0.5% requires 1 minute, although these results were with other coronaviruses and not MERS-CoV or SARS-CoV. The WHO recommends using 0.5% sodium hypochlorite or 70% ethyl alcohol for at least 1 minute. It has also been recommended to study the preventive effects of therapeutic oral biofilm rinses with βCD-Citrox to reduce the viral load of the infection and possibly the progression of the disease.2

Since SARS-CoV-2 is vulnerable to oxidation, the use of 0.5% H2O2 or 0.2% PVP-I as gargle/mouthrinse may minimize the risk of SARS-CoV-2 transmission.3 Chlorhexidine rinses do not appear to be effective in killing the virus.4

Approaches to nasal and oral decontamination with povidone-iodine (PVP-I), reduce nosocomial spread of Severe Acute Respiratory Syndrome-Coronavirus 2 (SARS-CoV-2).5 Povidone iodine 2-minute treatment reduces viral infectivity to below a detectable level in SARS-CoV and the efficiency of povidone iodine was similar to 70% ethanol in terms of reducing viral infectivity.6

Therefore, the present study reviewed the use of povidone-containing oral rinse to reduce the pre-dental viral load.

Materials and Methods

The PubMed and Cochrane databases were reviewed. Articles published between the years 2019 to 2020 were evaluated. The search terms used were: COVID-19, povidone, mouthwash, and viral load. A qualitative review of the data was performed.

Studies that met the inclusion criteria (clinical trials, prospective studies, and observational studies) were reviewed by two authors individually. Studies that did not meet methodological quality were excluded. Data were extracted, by first author, year of publication, type of study, povidone dose and time of use.

Results

The search revealed 19 studies, which after filtering left 15 studies for qualitative synthesis (Figure).

No clinical trials were found, but they were in the recruitment stage, so the protocols were presented (Table 1).

Regarding the use of povidone, the use of a dose between 0.2% to 2.5% was recommended four times a day (Table 2).
Table 1. Protocols of clinical trials published (n = 4).

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Type of study</th>
<th>Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rickett⁸ NCT04341688</td>
<td>2020</td>
<td>RCT</td>
<td>Drug: Saline oral/nasal rinse. Drug: 0.5% povidone/iodine oral/nasal rinse.</td>
</tr>
<tr>
<td>Nayak⁹ NCT04344236</td>
<td>2020</td>
<td>RCT</td>
<td>Drug: Povidone-iodine 2%. Drug: Povidone-iodine 0.5%. Drug: Isotonic saline 0.9%.</td>
</tr>
<tr>
<td>Mimoz1⁰ NCT04371965</td>
<td>2020</td>
<td>RCT</td>
<td>1% Povidone iodine mouthwash (95 mL), gargle, and nasal spray (2.5 mL by nostril), and 10% nasal gel (one drop).</td>
</tr>
<tr>
<td>Syed¹ NCT04341688</td>
<td>2020</td>
<td>RCT</td>
<td>Group A (n=10) 10 ml gargle and nasal lavage using 0.2% povidone-iodine (Betadiene). Group B (n=10) 10 ml gargle and nasal lavage using 1% hydrogen peroxide (ActiveOxy). Group C (n=10) 10 ml gargle and nasal lavage using neem extract solution (Azadirachta indica) formulated locally. Group D (n=10) 2% hypertonic saline (Plabottle). Group E (n=10) distilled water gargles.</td>
</tr>
</tbody>
</table>

Table 2. Recommended dosage and time on the use of povidone as a mouthrinse to reduce the viral load of COVID-19 (n = 5).

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Duration</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rickett⁸ NCT04341688</td>
<td>2020</td>
<td>4 times a day, for 7 days</td>
<td>0.5%</td>
</tr>
<tr>
<td>Nayak⁹ NCT04344236</td>
<td>2020</td>
<td>4 times a day, for 5 days</td>
<td>2% &amp;</td>
</tr>
<tr>
<td>Mimoz¹⁰ NCT04371965</td>
<td>2020</td>
<td>4 times a day, for 5 days</td>
<td>1%</td>
</tr>
<tr>
<td>Syed¹ NCT04341688</td>
<td>2020</td>
<td>20-30 seconds, twice daily for 6 days.</td>
<td>0.2%</td>
</tr>
<tr>
<td>Mady¹¹</td>
<td>2020</td>
<td>4 times a day</td>
<td>0.4%</td>
</tr>
</tbody>
</table>

**Discussion**

There is no clinical evidence regarding the use of povidone to reduce the viral load of COVID-19, but four registered clinical trials⁷⁻¹⁰ were included.

PVP-I formulations were shown to inactivate SARS-CoV-2 virus efficiently. Nasal formulation may potentially be used to inactivate SARS-CoV-2 virus in the nasal cavity thereby virus efficiently. Nasal formulation may potentially be used to completely inactivate SARS-CoV-2 after 15 seconds of contact but was able to inactivate the virus at 30 seconds of contact.¹⁵

Some disadvantages of the PVP-I oral solutions include the absence of clinical research such as randomized clinical trials, and the current absence of commercially available formulations at lower concentrations for intra-oral use. In the absence of appropriate commercially available preparations for routine dental use, dilution of the commercially available 10% povidone iodine by 1:20 utilizing 0.5 cc of 10% povidone iodine and 9.5 cc of sterile saline or sterile water for routine clinical use is recommended.¹⁶ However, dentists should make freshly diluted solutions each day and refrigerate them during the day as diluted PVP-I solutions are chemically unstable if the proportion is not correct.¹⁵

Even though only two respected databases (Cochrane and PubMed) were searched in this review, further studies including more databases should be performed.

**Conclusion**

Povidone mouthwash could be a viable solution before dental care that should be studied to reduce the viral load of COVID-19. Clinical studies are needed to confirm this.

**Disclosure statement:** The authors declared no conflict of interest.


