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Letter to the Editor

Povidone-iodine preprocedural rinse—An evidence-based, second-line defense against severe acute respiratory coronavirus virus 2 (SARS-CoV-2) in dental healthcare

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To the Editor—Ever since it began, coronavirus disease 2019 (COVID-19) pandemic has brought disruptions to almost all aspects of society, with far-reaching adverse impacts on clinical and economic fronts. Even amid effective vaccine rollout, which has rekindled the hope of ending this unprecedented global disaster, the COVID-19 pandemic continues unabated, with reports of a highly transmissible, mutant, severe acute respiratory coronavirus virus 2 (SARS-CoV-2) VOC 202012/01 strain and another SARS-CoV-2 20H/501Y.V2 variant. These strains could drive even larger waves of disease.[1] Due to high viral loads and the consequent transmission potential of asymptomatic and minimally symptomatic patients,[2] reducing the viral load in the oropharynx with adequate oral prophylactic measures is imperative to contain and prevent the spread of SARS-CoV-2 in public and dental healthcare settings. Considering the high-risk nature of the dental healthcare occupation due to the propensity for close-contact transmission through infective saliva, droplet splatter, and blood-mixed aerosols, procedural mitigation strategies involving prophylactic use of preprocedural mouth rinses (PPMRs) has been recommended to attenuate nosocomial transmission of SARS-CoV-2.[3] Different oral antiseptic agents have been employed as a second layer of defence against microbial load in dental aerosols: povidone-iodine (PVP-I), chlorhexidine gluconate (CHX), hydrogen peroxide, cetylpyridinium chloride (CPC), and essential oils.[4] A comparative in vitro study evaluating virucidal efficacy of different oral rinses demonstrated that mouth formulations containing 1% PVP-I, combination of dequalinium chloride and benzalkonium chloride, and a combination of ethanol and essential oils can significantly reduce SARS-CoV-2 viral infectivity within short exposure times of 30 seconds.[5] However, CHX-based mouth rinse exhibited weak virucidal efficacy. A recent systematic review found no scientific evidence supporting the virucidal activity of hydrogen peroxide mouthwash.[6] With the growing evidence amid the COVID-19 pandemic, evidence-based recommendations in favor of PVP-I as PMR have been increasing.

PVP-I or iodopovidone has been ubiquitously used as an antiseptic in healthcare settings for decades. Comprising iodine and the water-soluble polymer polyvinylpyrrolidone, PVP-I is considered favorable for its slow and gradual iodine release, minimizing toxicity, and for the resultant viral inactivation arising from its oxidative effect and lipid shell-membrane destruction.[7] Regarding the virucidal activity of PVP-I against SARS-CoV-2, Bidra et al[8] were among the first researchers to provide direct evidence of rapid in vitro virucidal action of 0.5% PVP-I oral rinse at the lowest contact time of 15 seconds. These researchers also showed that 70% ethanol-based rinse requires a minimum contact time of 30 seconds rather than 15 seconds to completely inactivate SARS-CoV-2. Subsequent in vitro studies conducted by Hassandarvish et al[9] demonstrated potent and rapid virucidal efficacy of 0.5% and 1% PVP-I rinse at the lowest contact time of 15 seconds, and Anderson et al[10] also demonstrated the efficacy of 1.0% w/v PVP-I oral rinse and 0.45% w/v PVP-I throat spray with a contact time of 30 seconds.

In real-time hospital settings, Martinez et al[11] reported significant reduction in SARS-CoV-2 viral load after rinsing with 1% PVP-I for 1 minute, with 3-hourly sustained clinical effects. A recently published sole randomized controlled trial involving 36 SARS-CoV-2–positive patients evaluated the in vivo efficacy of 3 commercial mouth rinses compared with water: PVP-I, CHX, and CPC.[12] Rinsing with 0.075% CPC and 0.5% PVP-I for 30 seconds decreased the salivary SARS-CoV-2 levels within 5 minutes of use, and the subsequent effects were sustained at 6-hour time points.

No cytotoxic effects of 1% PVP-I mouthwash have been reported when used at a concentration of 0.63 mg/mL (ie, 1:16 or lower dilution of the product).[9] Moreover, in addition to a well-established safety profile, PVP-I also exhibits good tolerability at concentrations as high as 2.5% for up to 5 months, with the absence of tooth or tongue discoloration or taste disturbances.[13] Unlike alcohol-based mouth rinse, it can also be used in conjunction with electrocautery, which also make it a suitable choice for use in maxillofacial surgery. Few contraindications for the use of PVP-I solutions include type 1 anaphylactic allergy to iodine (rarely encountered), active thyroid disease, pregnancy, and radioactive iodine therapy. Hence, proper medical and drug history should be reviewed before their use.

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In view of the fluid situation posed by the ongoing pandemic, Kirk-Bailey et al[14] recommend the use of 9 mL 0.5% PVP-I as a mouthwash and 0.28–0.3 mL 0.5% PVP-I as a nasal spray solution in each nostril, both for the patient before examination and/or treatment, and for the clinical staff prior to patient contact (repeated every 2–3 hours, up to 4 times a day, if multiple patients are seen). Due to the chemical instability of PVP-I with respect to disproportionation into constituent equilibrium species, freshly prepared dilutions should be used, and they should be preserved in the refrigerator for subsequent patients through the day.[8]

While reconciling the fact that postpandemic resurgences may occur as late as 2024,[15] safeguarding the oral healthcare workforce and patients becomes even more pertinent considering the perceived vulnerability to the SARS-CoV-2 infection in dental settings. With a growing body of direct evidence consistently supporting the effectiveness of PVP-I against SARS-CoV-2, it would be reasonable to prioritize the use of PVP-I as an effective and adjunctive procedural risk mitigation measure in dental healthcare in the contemporary pandemic crisis and through unforeseen similar pandemic threats.

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