I would like to make a strong case and suggest a new indication for an old drug which has been known for its strong bactericidal and virucidal properties. The drug is povidone-iodine (PVP-I). It has been used extensively over a long period of time as a strong antiseptic agent in different forms. In all these forms, it is used as a topical agent and has been found very efficacious and safe.\(^\text{[1-11]}\)

In the most common form, PVP-I is used as a surgical scrub and/or a surgical prep for sterilizing the skin for a major or minor surgical operation or some other invasive procedures such as local injection, aspiration, or cardiac catheterization. A 10% solution is used extensively for surgical prep and causes minimal skin irritation, especially when residual paint is washed off at the completion of the procedure. It is also used commonly as an over-the-counter agent for treating minor wounds and burns. 5% betadine (PVP-I) ointment is also used for this purpose and it acts as an effective antiseptic agent without any injurious or untoward effect on the skin.

PVP-I is used to sterilize the conjunctiva and cornea in the eye for cataract surgery. It is also used as an eye wash as a cleansing and antibacterial agent after accidental exposure to potential contaminants. It is used by dentists and oral surgeons to cleanse and sterilize the mucosal lining in the oropharyngeal cavity and on the gums. It is used by ENT surgeons to cleanse and sterilize the skin and mucosa in the nose and nasopharynx. Urologists and OB/GYNs use PVP-I solution or ointment to apply to urogenital skin and mucosa as a sterilizing and antibacterial agent. It is also used as a vaginal douche by women.

Intraoperatively, PVP-I solution has been extensively used by general surgeons to cleanse and wash heavily contaminated peritoneal cavity due to general peritonitis resulting from perforated viscus.
Based on all this, I conjecture to hypothesize that air actively inhaled through a very dilute solution of PVP-I (similar to a hookah) will be effective in killing the coronavirus (CoV)-2 without causing any significant injury to tracheobronchial tree or lung alveoli. This mode of application will essentially be topical in nature. If there is a chemical injury, it will be minor and reversible in my opinion. There will be some possible absorption from the alveoli into the blood, but the dose will be so small that it should cause no systemic effect or toxicity.[4,5]

In the following paragraphs, I will describe the dosage and the method of instituting this treatment as I see fit at this moment. With time and experience, we will learn more and make necessary adjustments and/or modifications.

Povidone-iodine hookah will consist of a small bottle or flask with a stopper with two holes. Through one hole, a small tube will enter and go down to just above the bottom of the bottle. This tube will be called air tube and its upper end will be just above the stopper. The second tube will be called hookah tube and it will enter the bottle through the second hole in the stopper, and it will project into the bottle for only a centimeter or two below the stopper. Its outer end will be connected to a flexible tube (preferably made of polyethylene) with a mouth piece at its end similar to that of a hookah.

The hookah bottle will be filled up to about one-third capacity with 1% PVP-I solution using sterile water to make it. The air tube will be adjusted up or down to leave about 1 cm length submerged in the PVP-I solution. To use the hookah, you will first exhale fully and then hold the mouth piece between the lips tightly. Immediately, thereafter, you will suck the air from the hookah bottle with a deep inhalation. You will then hold the breath for a few seconds and exhale slowly through the nose. Then, you will repeat the process with a second deep puff and again hold the breath for a few seconds before slowly letting it out through the nose. A total of five puffs will make one dose. Someone suffering from COVID-19 who is able to breathe normally the total daily dosage will be one dose every hour or so during the day for a total of 10 doses. In most cases, a 4–5 days course of this therapy will be enough to kill the virus adequately. In some cases, 7 days treatment may be needed.

Now, the basis and the rationale of this dosage: An adult male normally has a tidal volume of about 500 mL at rest. With a deep puff, he will presumably inhale twice as much that is 1000 mL. One cubic meter of air contains about 20 g of water at 100% relative humidity at room temperature. In other words, 1000 L (1 m³) of air will hold about 20 g of water at 100% relative humidity. Hence, 1 L of air at 100% humidity at room temperature will contain 20 mg of water. All the air being inhaled from the hookah bottle is coming through 1% PVP-I solution and should have 100% relative humidity. One liter of this air contains 20 mg of water with 1% PVP-I in it. That comes to 0.2 mg of PVP-I in each hookah puff. Hence, five puffs will provide a total of 1 mg of PVP-I. A total daily dosage of 10 hookah sessions will provide a total of 10 mg.
Gandhi: Povidone-iodine hookah therapy

of days or weeks and if this therapy is found to be safe, it can be put to clinical trials or even clinical use immediately.

Being a pathologist, a general surgeon and a thoracic surgeon and having used PVP-I in thousands of surgical cases over a period of 40 plus years, I feel fairly confident that my hypothesis will pass the test. If that happens, we would have found a simple and inexpensive therapeutic measure for COVID-19. Since I was convinced about the efficacy of this treatment, the only remaining question in my mind was about its safety. So I made a simple hookah using a glass bottle, 1% PVP-I solution and two straws going through a make shift cellophane airtight lid. Then, I exhaled fully and took a deep puff of air from the straw coming out of the upper part of the bottle. I could hear the bubbling sound like in a hookah. For this puff, I used my nearly full inspiratory capacity and must have inhaled at least 2000 mL of air. After two or three normal breaths each time, I repeated the process for 4 more times thus making a total of five puffs during the course of 1–2 min. This was twice the amount of dose recommended above. My oxygen saturation measured by a pulse oximeter before this exercise was 96–98% and remained unchanged 1 min, 5 min, 1 h, and 4 h after this exercise. My heart rate also remained the same, 72–75/min. These parameters showed no change in 24 h and I did not experience any untoward symptoms.

In view of the raging pandemic which has already claimed over 250,000 lives in the U.S. and close to 2 million lives worldwide, it is my recommendation that physicians taking care of patients with COVID-19 should give this treatment a try. I think that they have the discretionary authority to use medicines for “off label” indications under special circumstances, if in their opinion, potential benefits outweigh potential risks and the patient agrees. The Food and Drug Administration and similar health agencies in other countries should also make and the availability of PVP-I all over the world will make it possible for physicians around the globe to successfully use this therapy for their patients. They will need to make sure that there is no mix up or confusion between the hookah tube and the air tube and that their patients will always inhale from the hookah tube and not the air tube. Accidental sucking from the air tube may cause aspiration of PVP-I solution into the lungs and severe pneumonia. This must be avoided at all costs. Patients who are allergic to iodine will not be able to use this treatment.

Vaccines for CoV, SARS-COV-2, have been made with unprecedented speed and are being rolled out as fast as humanly possible. It will still take many years to inoculate the entire population on the planet. We do not know how long the immunity will last after vaccination. Nor do we know if this virus will mutate or keep on mutating into new strains requiring new vaccines in the future. No one can predict about the eventual outcome of this pandemic or future epidemics caused by respiratory viruses. Having an effective antiviral therapy for respiratory viruses, therefore, is of paramount importance.

It behooves the physician and scientific community around the world to put the hypothesis presented above to test, and hopefully find in it, a cure for the devastating scourge being caused by the CoV (SARS-COV-2).

References


3. Aceves C, Anguiano B, Delgado G. The extrathyronine
actions of iodine as antioxidant, apoptotic, and differentiation factor in various tissues. Thyroid. 2013;23:938-46.