

## **A Possible Simple Method to Control COVID-19 and Bacterial Pneumonia Infection**

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COVID-19 disease has many unknowns at this stage. The route of infection seems to be predominantly via oral/nasal/respiratory tract (although the GIT may also be involved).

The longevity of immunity acquisition is not known (if any), the period of infection seems variable, and the pathogenesis seems to vary between direct viral infection and an immune response to cytokine storm, although a recent report indicates an atypical coagulation problem may be involved – but how and why has not been explored yet.

Perhaps most importantly, it does not seem obvious yet as to what viral load is required, or whether the point of infection alters the response to infection.

It seems the world is now entering a “post first wave” phase which is likely to continue for years. Development and efficacy of a possible vaccine is problematic and at this point, there has been limited effective pharmaceutical treatment (except perhaps steroids that might help reduce the cytokine response).

Despite these unknowns, it seems probable that viral load will play some part in infection response and consequent morbidity and mortality rates. This may depend on the load at the time of initial infection, or from repetitive exposure, or cumulative colonisation load during the incubation period, or perhaps the site of infection is important.

I therefore suggest that an interceptive disinfection method to reduce viral load is worthy of consideration. I would particularly advocate disinfection of the respiratory tract. This would also be very applicable in cases of bacterial pneumonia, but I would also suggest such disinfection would be prudent as soon as a patient is found to be positive with COVID-19. I suggest this because I would suspect such treatment would lessen virus numbers (at least in the respiratory tract) and thus reduce the possibility of a pneumonia outcome or gross infection of other organs. As well, hopefully such treatment would reduce a cytokine response because theoretically the viral insult would be less.

The question is: “How can you disinfect effectively without causing bodily harm?” I believe I have an answer using a cheap and simple agent.

Hypochlorous acid (HOCl) solution can be cheaply produced by electrolysis of mild saline solution (<0.25% to 0.5% - ie approximately the concentration of NaCl in tap water of some communities) and has been well researched (eg it has been used for: human food disinfection, disinfection in veterinary surgery, human dental treatment, hospital wall, floor and air disinfection and many more applications). In very low doses (ranging from 20 ppm to 400 ppm) HOCl has been documented to have a 99.9% kill rate on multiple bacteria and virus types (including coronaviruses) after as little as a 30 second exposure time. Yet HOCl has also been found to be nontoxic to humans. A recent report (as yet unpublished) on in vitro application of HOCl (approximately 300 ppm spray) to human lung cells showed no harm to alveolar cells.

HOCl is produced by various companies around the world as a disinfectant. The solution is readily available and so is equipment to manufacture HOCl in commercial quantities. Shelf life is relatively short (about 3 months) but can be extended to about 18-24 months if storage conditions comply with various criteria.

I started investigating HOCl solution as a therapeutic mouth wash last year. I found there were no deleterious effects to patients or their oral tissues and very preliminary results indicate it might be beneficial to dental health (final data acquisition was stopped due to enforced COVID-19 shut down). When the COVID-19 pandemic commenced, I proposed that HOCl could be used in an air nebuliser (heat will inactivate the solution) and inhaled as a disinfection agent. We have tried this method of application using a small number of healthy adult volunteers. No adverse reactions were reported and breathing function remained normal. This was a very small and preliminary trial and proper double blind clinical studies should be carried out. However, the urgency and severity of the COVID-19 pandemic requires a quick medical response.

Theoretically, HOCl inhalation should kill large numbers of COVID-19 virus. Whether this can reduce morbidity and mortality remains to be seen but I believe it should be considered as a treatment modality. While my suggestions could be considered premature, the urgency created by the pandemic for an effective treatment has prompted me to offer my suggestions at this time. HOCl is readily available, cheap, nontoxic, has a high kill rate for corona virus and is easily administered by a simple air flow nebuliser. Total treatment for over 2 weeks for each patient (including the cost of a personal nebuliser) would be less than \$300.

I feel it is important the medical profession is made aware of an option for treatment of COVID-19 infection – especially in third world countries or any countries where there is no reasonable medical facility/equipment available due to lack of units. Of course it could also be considered for those who are considered too old (above 60-70?) to be given conventional treatment due to an overloaded health care system (possibly USA, UK, India, Brazil).

If I had COVID-19 infection (and especially if I was told I would be refused treatment of any complications due to an overloaded healthcare system) I would not hesitate to use HOCl in a nebuliser – indeed I have already used it to help control a minor upper respiratory tract infection.

I hope my suggestions might be useful for clinicians seeking a simple and potentially effective treatment for COVID-19 infection.

**Please note:** The suggested active agent is hypochlorous acid, NOT hydrochloric acid or hypochlorite.

Disclaimer: I have no financial interest in the suggested agent or equipment, albeit that the manufacturer supplied free HOCl solution and saline placebo for the purpose of clinical trials.