

The importance of using hyperoxygenated water in removing SARS-COV-2 residuals

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Dear Editor,

I would like to bring to the attention of the scientific community what I observed during my stay as a volunteer internal medicine doctor at the COVID infectious department of the Eugenio Morelli Hospital in Sondalo (SO).

The evidence reported is given by clinical experience and qualitative evaluation of the results that emerged.

The investigation of SARS-CoV2 patients in the hospital has brought to light an interesting observation: some patients who no longer show symptoms of COVID-19 infection for a period of time between 7 and 10 days continue to test positive to the molecular swab for the detection of SARS-COV2.

The incubation period for COVID-19 ranges from approximately 48-72 hours up to two weeks. An individual's infectivity generally ranges from the onset of symptoms and extends beyond 10 days after the first symptom. An analysis of 181 confirmed cases of COVID-19 with exposure and period of onset of identifiable symptoms estimated that the mean incubation period was 5.1 days with a 95% CI of 4.5 to 5.8 days.¹ The authors estimated that 97.5% of those who develop symptoms will do so within 11.5 days (8.2 to 15.6 days) of infection. Less than 2.5% of infected people will show symptoms within 2.2 days, while the onset of symptoms will occur within 11.5 days in 97.5% of cases.

On average, those hospitalized can take two to eight weeks to recover. In fact, in many cases the disease can last longer than the classic 15-20 days estimated at the beginning of the epidemic, because there are patients who keep the positive swab for a long time, even long after the symptoms have disappeared. A clinically cured patient therefore no longer exhibits the symptoms of COVID-19, but may still test positive for SARS-CoV-2.

An example is reported in the work published by Mancuso *et*

al.,² whose analysis, conducted between February and April 2020, showed that viral clearance was achieved by about 60% of patients with an average time of 30 days from diagnosis and about 36 days after the onset of symptoms. In other words, nearly half of the symptomatic patients still tested positive one month after the first swab.

The positivity of the swab, even in absence of symptoms, forces the patient, hospitalized or not, to respect a period of quarantine until become negative. This period leads to alienation from social life with a consequent negative psychological impact on the person and in some cases with the onset of psychopathological symptoms, from anxiety disorders to depression.

The hypothesis of our research group, derived from the observation of patients admitted to the Morelli Hospital in Sondalo, is a possible persistence of non-infectious viral material in the nasal turbinates.

The nasal-oro-pharyngeal swab used to look for SARS-COV2 must be performed accurately to ensure adequate collection of biological material. Therefore, it is useful to carry out both the samples from the oropharynx and from the nasopharynx to increase the probability of finding the virus. It is also important that the swab is performed in the best way: to have value, the sample from the nose must be performed by pushing the swab down, to reach the nasopharynx. A swab that is pushed upwards does not touch the tissue in the nasopharynx and therefore can lead to a false-negative or false-positive result.

PCR tests for the detection of SARS-CoV2 look for genetic material belonging to the coronavirus, but are unable to discern between live replicating virus and non-infectious viral residues. This means that it is possible to have a positive swab even in the absence of infectious viral particles, but in the presence of fragments of their genome, as reported in the literature.³⁻⁵

This would explain the gap between the disappearance of symptoms and the delayed negativization of the molecular swab.

To this purpose, we started an analysis on 12 hospitalized patients who showed a delayed negativization of 7-10 days respect to clinical recovery. The patients taken for analysis showed a return of parameters and the absence of clinical signs of COVID-19, but with a positive swab.

Patients were asked to perform nasal washes with hyperoxygenated water for 3-4 times/day. In our case, hyperoxygenated water was obtained with Ozon ONE by Cerebro®, a CE device that supply ozone at a concentration of 500 mg/h. Hyperoxygenated water can be obtained with any machine that dispense ozone for medical purposes. Peculiarities in the use of Ozone (O₃) from a pharmaceutical and biochemical point of view are listed in several scientific papers especially now trying to report preliminary evidences of its use in patients with SARS-CoV2.⁶⁻⁹

A first molecular swab, which tested positive for the 12 patients, was carried out on December 21st 2020. This result was

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followed by washing of the nasal turbinates according to the procedure mentioned above on December 21st, 22nd and 23rd. The molecular analysis of the swabs carried out on 24 December reported negative results, allowing the discharge of the recovered.

Since the negativization of the swab in hospitalized patients is the only valid criteria for their discharge, I consider it is important to place an emphasis on this procedure.

Washes with hyperoxygenated water would be useful in eliminating any inactive viral fragments within the nasal turbinates and would allow for a prompt discharge of the patients. This procedure would be valid to avoid the prolongation of hospitalization in infectious wards, minimizing the risk of respiratory and nosocomial superinfections (for example *Clostridioides difficile* infection). Furthermore, the negativization of patients in conjunction with the disappearance of the symptoms of COVID-19 would allow for early discharge and the release of beds for new patients.

On a social level, the implication determined by a shorter quarantine than the long periods that elapse from the disappearance of symptoms to the negativization of the tampon should not be underestimated. It's important to remember that not all COVID-19 patients are hospitalized; those without severe respiratory symptoms pass the disease in home isolation, separated from all other members of their family. In both cases, the resulting situation negatively affects the patient from a psychological point of view. Therefore, decreasing the time gap between the disappearance of the symptoms and the negative outcome of the molecular swab allows patient to suspend social isolation earlier and to return to social life with a consequent improvement in their psychological condition.

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