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Perspective

Treatment of COVID-19 with Individualized Immune Boosting Interventions

Mohan Doss[a,*]
[a]Fox Chase Cancer Center, Philadelphia, USA.
[*]E-mail: mohan.doss@fccc.edu

Abstract

The current global pandemic of coronavirus disease 2019 (COVID-19) caused by the coronavirus SARS-CoV-2 has already had a major adverse impact on the world due to the exponentially increasing deaths due to the disease and the extreme actions taken by the world community to prevent its spread. It is important to explore novel methods of reducing the illnesses and fatality rates of the coronavirus-infected patients. Since the weakness of the immune system is one of the major contributing factors for the illnesses caused by such viruses, and since inflammation is a major contributing factor for the mortality of COVID-19 patients, interventions that boost the immune system and/or are anti-inflammatory may reduce the COVID-19 incidence and the mortality due to the disease. A large variety of interventions are known to improve the immune response and/or reduce inflammation. However, all the interventions would not be applicable or acceptable to everyone and so the interventions would need to be individualized based on individual circumstances and preferences. This approach, known as "Individualized Interventions to Improve the Immune Response", or the I^4R approach, should be studied in pilot clinical trials urgently, in order to potentially reduce the harm caused by the current coronavirus pandemic.

Keywords: COVID-19, coronavirus, SARS-CoV-2, respiratory illness, pneumonia, I4R approach, immune system, inflammation, immune boosting interventions

Background

There are major concerns regarding the current global pandemic of coronavirus disease 2019 (COVID-19) caused by the coronavirus SARS-CoV-2 (Gates, 2020). Whereas most of the infected individuals have no symptoms or only mild symptoms, in a small minority, the infection can lead to respiratory illnesses including pneumonia which can sometimes result in death (Wu, and McGoogan, 2020). One major concern is the person-to-person transmission of the coronavirus by asymptomatic individuals during the incubation period (Yu et al., 2020), making it difficult to limit the spread of the disease. Another major concern regarding the pandemic is the large case fatality rates of the patients infected with the coronavirus, e.g., 2.3% average case fatality rate of the COVID-19 patients that was noted in China, with the rate increasing to 8% for patients aged 70 to 79 and 14.8% for those aged 80 and over (Wu, and McGoogan, 2020). With such fatality rates, there is a potential for large numbers of fatalities with the spreading of the disease to the wide population. The number of daily new cases in China is currently in decline following the drastic steps that were taken but the number of cases and fatalities are increasing exponentially in the rest of the world (WHO, 2020). Many drastic steps are underway worldwide to limit the spread of the disease, e.g. cancellation of conferences and large gatherings, closure of schools, curtailment of travel, lockdowns, etc. Considering the magnitude of the adverse impact on the social, cultural, commercial, educational, scientific, health, and other aspects of the society from such steps and the large anticipated casualties with the expected spread of the disease worldwide, it is important to explore additional methods of reducing the illnesses from the coronavirus infection and the fatality rates of the COVID-19 patients. In this article, I am proposing that individuals infected with the coronavirus be treated with multiple immune boosting and/or anti-inflammatory

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interventions that are applicable and acceptable to them in order to reduce the occurrence of respiratory illnesses including pneumonia and to reduce the mortality rates of those afflicted with the COVID-19 disease.

Prevention and Treatment of Pneumonia

The weakening of the immune system is one of the major reasons for the increased incidence of community-acquired pneumonia in the elderly (Meyer, 2001) and inflammation has been implicated for the increased mortality rates in pneumonia patients (Curbelo et al., 2017). Hence, an improvement in the immune system response may be effective in reducing the incidence of pneumonia and reduction of inflammation may be effective in reducing the mortality rates due to pneumonia. There are indeed a large variety of interventions that can improve the immune system response and/or reduce the inflammation, e.g. physical activity or exercise, dance, sauna, cold shower, forest bathing trips, living at a high elevation, sunlight exposure, yoga, rhythmic breathing, meditation, laughter, tai chi, acupuncture, smoking cessation, calorie restriction, intermittent fasting, fruit-vegetable consumption, vitamin D supplementation, yogurt, probiotic foods, whole grains, consumption of deuterium-depleted water, aspirin, statins, avoiding excessive alcohol consumption, reducing red meat in diet, massage, having adequate sleep, reducing light at night, reducing circadian disruption, psychological counselling, pleasurable experiences, exclusive breastfeeding, influenza and other vaccinations, exposure to low-level radiation, short-term exposure to radiofrequency radiation, radon spa therapy, ultraviolet blood irradiation, ozone therapy, hyperthermia, whole body vibration exercise, hyperbaric oxygen therapy, mixed bacteria vaccine, and infection (Doss, 2019). However, all the interventions would not be applicable or acceptable to everyone and so the interventions would need to be individualized based on individual circumstances and preferences. This approach, known as "Individualized Interventions to Improve the Immune Response", or the I^4R approach, has been proposed for preventing and treating cancer, based on the important role weakening of the immune system and chronic inflammation play in the development of clinical cancer (Doss, 2019). Since the weakness of the immune system is one of the major contributing factors for the occurrence of pneumonia, and inflammation contributes to increased mortality rates of pneumonia patients, I am proposing the use of the I^4R approach for preventing or reducing the occurrence of respiratory illnesses including pneumonia in coronavirus-infected individuals and for treating COVID-19 patients also.

Multiple Immune Boosting/Anti-Inflammatory Interventions

Let us consider the effect of three of the immune boosting/anti-inflammatory interventions - sauna use, statins, and acupuncture - on the incidence of community-acquired pneumonia. Sauna use four or more times per week was associated with a reduced risk of pneumonia, with the relative risk (RR) for incidence being 0.63 (95% CI: 0.39–1.00) (Kunutsor et al., 2017). Those using statins had a reduced occurrence of pneumonia, with RR being 0.84 (95% CI: 0.74–0.95) (Khan et al., 2013). Acupuncture reduced the risk of pneumonia in stroke patients with RR being 0.86 (95% CI: 0.82–0.90) (Chang et al., 2018). Based on these observations, if all the three interventions are applicable and are utilized, and we assume that the observed reductions in the pneumonia incidence due to the individual interventions are not correlated, RR for pneumonia incidence would be the product of the individual RRs, and is calculated to be 0.46 (95% CI: 0.23–0.68). Though this is a rough estimate due to the simplifying assumptions made and the limited evidence available on the interventions, the 54% reduction in the pneumonia incidence from the use of these three interventions is indicative of the immense power of this approach.

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Let us now consider the use of three of the interventions - low-level radiation, statins, and aspirin - for the treatment of community-acquired pneumonia. Many studies have reported treating pneumonia patients by giving 30 cGy or higher radiation dose to the lungs using X-rays, and the average cure rate for all the studies was 83% (Calabrese, and Dhawan, 2013). In one of the studies cited, X-ray treatment of pneumonia reduced the fatality rate from 28%, observed in prior years, to in 5.7% (Rousseau et al., 1942), corresponding to RR for mortality of 0.21 (95% CI: 0.04–0.37). In the same study, all the pneumonia patients who had not responded to sulfonamides, and so likely had viral pneumonia, recovered following the X-ray treatment (except for those who died within 15 hours of the treatment), indicating that the X-ray treatment was effective for treating viral pneumonia also. These results are very impressive indeed. Therefore, use of X-rays should be considered for treating the COVID-19 patients, even though the data are from studies performed over 80 years ago. The use of Simvastatin reduced the mortality of pneumonia patients with RR being 0.50 (95% CI: 0.13–0.88) (Sapey et al., 2019). Aspirin therapy has been observed to reduce the mortality of pneumonia patients with RR being 0.65 (95% CI: 0.53–0.81) (Falcone et al., 2019). If these three interventions are applicable and are utilized by pneumonia patients, RR from the use of all the three interventions would be the product of the individual RRs (assuming that the observed reductions in the mortality rates due to the interventions are not correlated), and is calculated to be 0.07 (95% CI: 0.0–0.14). Though this is a rough estimate due to the simplifying assumptions made and the limited evidence available for the interventions, the 93% reduction in the mortality rate from the use of these three interventions is indicative of the immense power of this approach.

Many more immune system boosting and/or anti-inflammatory interventions are available, and the use of the additional interventions, selected based on individual circumstances and preferences, i.e. the I^4R approach discussed earlier, may reduce the pneumonia incidence and mortality rates even further. Thus, this appears to be a very powerful approach indeed.

Clinical Trials of Individualized Interventions

Though the vast majority of the coronavirus-infected individuals have mild symptoms, a small minority of the infected individuals develop respiratory illnesses including pneumonia requiring hospitalization. It may be hypothesized that the individuals who develop respiratory illnesses have a weaker immune system compared to those who have only mild symptoms. Based on this hypothesis, if the immune system is boosted in those infected with the coronavirus using the I^4R approach when they show the slightest symptoms of the infection, the boosted immune system may be able to overcome the viral infection and prevent the infection from developing into respiratory illnesses which require hospitalization. Early intervention, at the first observation of the symptoms of the infection, would be preferable, as there would be fewer number of viruses at the early stages of the infection, making it easier for the boosted immune system to eliminate them.

Since the conventional treatments of COVID-19 patients have not been sufficiently effective and the mortality rates of the patients are high, it is incumbent upon us to test promising unconventional approaches that have a chance of reducing the illnesses caused by the coronavirus infection and the mortality rates of COVID-19 patients. The reasoning and evidence presented above indicate that the I^4R approach may be effective in reducing the incidence of respiratory illnesses in the coronavirus-infected patients and the mortality rates in COVID-19 patients. Pilot clinical trials are needed to validate this approach. For the conduct of the pilot clinical trials, the radiation dose of 30 cGy to the lungs may be applied using the standard radiographic and fluoroscopic systems, which would be readily available in the hospitals worldwide, with repeated and prolonged exposures, respectively.

Conclusion

If the pilot clinical trials show that the I^4R approach is effective in reducing the respiratory illnesses in the coronavirus-infected individuals and in reducing the death rates of COVID-19 patients by a large amount, the approach can be adopted worldwide, reducing the illnesses and fatalities due to the coronavirus infection. This may reduce and eliminate the extraordinary concerns that have arisen regarding the coronavirus. Then, we may be able to rescind the extreme and drastic steps that have been taken for social distancing, enabling a fast return to normalcy in the world. Therefore, it is very important that the clinical trials be started urgently.

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Conflict of Interests

None.

Disclaimer

The opinions expressed in this article reflect the views of the author and do not necessarily represent the views of his employer.

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