

Heat and Humidity as Potential Therapeutic Options for COVID-19 Prevention

Vikas Gupta¹, Retash Shan², Shomalla Jan³, *Kailash Singh⁴

1(Department of Anesthesiology, GMC Jammu, JK UT, India)

2(Department of Physiology, GMC Jammu, JK UT, India)

3(Department of Anatomy, GMC Kathua, JK UT, India)

4(Department of Surgery, GMC Jammu, JK UT, India)

**Corresponding Author: Dr. Kailash Singh, Email: gmcjammuinvestigator@gmail.com*

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I. Introduction

Although the emergence of new coronavirus diseases, probably originating from bats in China, had been predicted by early March 2019 [1], no international preventive action was taken. Finally, after several cases of pneumonia with an unfamiliar etiology were observed at the end of 2019, the National Health Commission of China released more details about the epidemic in early 2020 [2]. The causative virus was initially called novel coronavirus 2019 (2019-nCoV) by the World Health Organization (WHO), but it was then renamed as "severe acute respiratory syndrome coronavirus 2" (SARS-CoV-2) by the international committee of the Coronavirus Study Group (CSG), and the disease called coronavirus disease 2019 (COVID-19) by WHO [3]. The human-to-human transmission of this virus through coughing, sneezing, and the spread of respiratory droplets or aerosols was accepted. In addition, almost all countries in continents throughout the world reported disease spread caused by aerosol penetration into the upper respiratory tract and lungs via inhalation [4,5]. There followed a rapid growth in the number of cases all around the world. There are a range of heat-based interventions that can be used alongside other personal hygiene measures to aid in overcoming COVID-19. For example, warming and humidifying indoor environments can prevent drying of the nasal mucosa, increase muco-ciliary clearance and nasal patency and provide symptomatic relief. The direct application of heat to the upper airways, routinely or at the first signs of infection, may further serve to inhibit or deactivate virions in the place where they first lodge. This has been demonstrated in vitro with temperatures of 45°C for 20 minutes activating immune cells, releasing HSPs and suppressing rhinovirus multiplication by more than 90% [6]. The present study aims to prevent the disease through potential therapeutic options viz., heat and humidity

II. Aims and Objective

To study the effect of heat and humidity as preventive measure for COVID-19

III. Material and Methods

The present study was conducted at Govt. Medical College and Associated Hospitals, Jammu (J&K). The patients were divided into 2 groups. Group 1 consisting asymptomatic patients which were exposed to COVID-19 patients either through travel or direct contact and this group included doctors and Nurses. These patients were advised to take steam twice daily by inhalation through ordinary steamers available on the market or by simple boiling of water and inhalation of resulting steam. Group 2 patients were further divided into two classes viz., Mild and Moderate. In mild group patients with symptoms of only 1 area like nasal, throat or bronchial were included while patients with symptoms of 2 or more areas were included in the moderate group. The patients with symptoms of dyspnea and required ventilator or oxygen support were excluded from the study.

The patients continued the treatment as per hospital protocol. Patients were tested for COVID-19 after steam therapy after 5 days and till COVID was negative for 2 consecutive tests. Group 2 consisted of Symptomatic patients tested positive on the standard COVID-19 test. Most of these patients were medical staff which included doctor and nurses from Public hospitals who had contacted COVID in the line of their work. Number of patients in Group 1 were 25 health care workers and the number of patients in group 2 were 80 which included patients and healthcare workers

Steam was administered in following doses

Group 1 - Steam twice daily or more for 5 minutes by nasal route with intermittent breathing by oral route.

Group 2 - Steam inhalation was administered by nasal and oral route every 3 hours for 5 minutes.

IV. Results

In Group 1 none of the patients showed any sign of progression to COVID-19 symptoms after a follow-up ranging from 14 days to 2 months.

In group 2 Mild symptoms regressed in 3 days to normal and in moderate symptoms it took 7 to 10 days to return to normal.

The COVID-19 test done after 10 days was negative in 59 cases. In 18 cases it took 14 days for COVID test to return to negative and in 3 cases it took 18 days for COVID test to return to negative.

V. Discussion

The stability of the virus at different temperatures and relative humidity on smooth surfaces were studied. The dried virus on smooth surfaces retained its viability for over 5 days at temperatures of 22-25°C and relative humidity of 40-50%, that is, typical air-conditioned environments [7]. However, virus viability was rapidly lost ($>3 \log(10)$) at higher temperatures and higher relative humidity (e.g., 38°C, and relative humidity of $>95\%$) Steam has a temperature of about 700 to 800.Celsius which is well above the instability temperature of SARS Corona virus.

One study investigated the relationship between the mean daily average temperature and the average rate of increase of new patients with COVID-19. Five countries (Iran, Italy, Germany, Spain, and United States) were studied. The results of this study found that in all studied areas, a significant difference in the average daily air temperature between the two regions was associated with a substantial difference in the daily average cumulative rate of new patients in those two regions [8].

In recent years far-infrared (FIR) saunas have been used as an alternative to the traditional Finnish saunas. These saunas use infrared emitters without water or added humidity and generally run at lower temperatures than Finnish saunas. FIR radiation is reported to deactivate single-strand RNA viruses [9] and FIR saunas have been shown to raise body temperature, induce hormetic stress responses and support host defenses [9]. FIR saunas, along with other heat-based technologies may therefore also prove useful in treating patients with COVID-19.

VI. Conclusion

Heat is a cheap, convenient and widely accessible therapeutic modality with a long history of traditional use, yet it remains to be seen if heat can be effective in the treatment or prevention of COVID-19. The relatively low cost and wide availability of heat-based treatments, along with multiple mechanisms of action that include both physical and psychological dimensions, makes heat an attractive option for combating viral infections. The COVID -19 virus symptoms drastically reduced after the administration of steam. No further transmission was observed in patients taking steam. It was concluded that steam can be permitted as an adjunct to social distancing, sanitizers and masks and PPE for an effective treatment for precaution as well as cure for COVID-19 infection. Further studies are required on a larger scale in Asian and Western countries for their population.

Keyword: Heat, Humidity, COVID-19

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