

Role of Vitamin C and D in COVID-19

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In early 2020, World Health Organization (WHO) declared COVID 19 is a Public health emergency, unfortunately till now we are unable to find out the treatment. However, various precaution measures recommended by the WHO, which somehow control this infection but still this deadly situation exists which continuously killing the humanity worldwide. This infection is much more serious in patient who are having low immunity, hence the use of immunity booster such as antioxidant especially vitamin C and D may be counteract this disease.

Keywords: *Antioxidant; Vitamin C; Vitamin D; COVID 19; Clinical Study***Introduction**

After the reported of first case of Corona virus on 31 December 2019 in WHO Country Office China, it diffused across boundary and became a pandemic. As per WHO, till 18 April 2020, around 2,164,111 confirmed cases and 146,198 deaths worldwide were identified and reported (<https://covid19.who.int/>). Currently, we are enough prominent equipped to curb the new pandemics as compared with previous encountered epidemics. The new virus infection cause, genetic makeup, testing (RT-PCR) [1] and possible treatment methods [2] (vaccines, plasma therapy etc.) were identified and made public. Apart from this real time online data base was also developed by WHO and government of all countries which enables us to statistically analyse the new viral infection.

Unfortunately, till now we have only elementary knowledge about the COVID-19 infection spread; direct contact either by touching the infected person or it fomites, by droplet infection etc.

therefore WHO make guidelines regarding the precaution could be taken including, washing of hand with soap (at least 20 sec) or by alcohol base sanitizer, keep distance of one arm or one meter, maintain social distancing, lockdown etc. Now this novel virus infection breaks all boundaries and create deadly situation on human existence globally and people are searching the ways for assure themselves. There are a plenty of literature available which stated that antioxidant helpful in the treatment of several viral disease. To keep in this mind the present review explores the role of Vitamin C and D in the COVID 19 infection.

Ascorbic acid or vitamin C

Ascorbic acid or Vitamin C having antioxidant and anti-inflammatory properties, on illness/sepsis cytokine level climb up and accumulation of neutrophils occurred in the lungs causing alveolar destruction [3]. Vitamin C not event stops this process but, also

helps to eliminate alveolar fluid by stopping the activation, accumulation and formation of neutrophil extracellular traps. It also showed the protective action against influenza by shorting the duration of common cold. It is the well known that Vitamin C having excellent antioxidant activity which not only scavenge the harmful oxidative species but also boost immune system. However, during critical illness the level of vitamin C are depleted and patient need high dose if Vitamin C (in gram by IV route).

Previous research has indicated that vitamin C, reduced the rate of mortality and same thing was observed in the patients suffering from COVID19 infection in USA. As per the published report in critical care [4] in March 2020, stated significance fall in mortality has been observed in 167 USA COVID 19 patients treated with vitamin C (15 gm/day for 04 days, IV) as compared to the patients treated with hydrocortisone.

As of March 2020, trail (NCT04323514) conducted at the Arnas Civico-di Cristina-Benfratelli National Relevance Hospital in Palermo, on 500 hospitalized patients with positive swab test of SARS-CoV-2 with interstitial pneumonia showed significant reduction in mortality and Resolution of symptoms (Fever, Cough, Shortness of breath or difficulty breathing) after treated with 10 gm of vitamin C intravenously.

Recently, clinical trail has begun in Wuhan, China on 140 critical ill COVID-19 patients, to study the effect of Vitamin C (24 gm/day for 07 days, IV) against placebo control along with the requirements of number of ventilators, drug (vasopressor), duration of ICU stay, organ failure and 28 days mortality rate.

In April 2020, clinical trial (NCT04335084 just registered in clinicaltrials.gov) has begun in Progena Biome Ventura, California, United States, on 600 hospitalized patients with negative testing with RT-PCR for COVID-19 infection treating with Hydroxychloroquine, Vitamin C, Vitamin D, and Zinc to determine whether these therapies in combination can prevent COVID-19.

Vitamin D

Naturally occurring, fat soluble vitamins occurring in few foods and available as a dietary supplement, providing the mineralization to bone by calcium absorption and prevent hypocalcemic tetany and bone remodelling. Endogenously it produced when ultraviolet rays (UV) of sun fall on skin, synthesized 7- Dehydrocholesterol

which produced Vitamin D₃ on thermal reaction and formed 25-Hydroxy Vitamin D₃ in liver and in kidney it finally converted in to 1,25-Dihydroxy Vitamin D₃ (responsible for maintaining the calcium balance in the body). Vitamin D enhances cellular immunity by A) the induction of human cathelicidin (antimicrobial activities against all negative bacteria, enveloped and non-enveloped viruses, and fungi) and defensins. B) by reducing cytokine storm (generates both pro-inflammatory and anti-inflammatory cytokines) in counter to viral and bacterial infections. It also increases the level of antioxidant by enhancing the glutathione production (saves ascorbic acid use). Previously various ecological studies reported the high dose of Vitamin D prevent the progression of Dengue [5], Hepatitis C [6], HIV [7] and Influenza Virus [8]. Currently, in April 2020 clinical study (NCT04335084) has begun on 600 patients suffering from COVID 19 infections at Progena-Biome Ventura, California, United States to observe the effect of Vitamin D along with Hydroxychloroquine and Zinc.

Currently, in April 2020 clinical study (NCT04335084) has begun on 600 patients suffering from COVID 19 infections at Progena-Biome Ventura, California, United States to observe the effect of Vitamin D along with Hydroxychloroquine and Zinc on the mortality rate.

Similar study (NCT04344041) is also carrying out in six different areas of Frances, including 260 serious COVID 19 infected patients, treated with Vitamin D (cholecalciferol 200,000 IU and cholecalciferol 50,000 IU) to observe the effect of Vitamin D on mortality rate on 14th and 28th days incubation period.

Conclusion

The data reviewed strongly support the role of Vitamin C and D in reducing the risk of infection and mortality rate in COVID19 patients, however still the research is going on, so our conclusion is limited, we will hope that very soon some concrete will come and protect world from the grip of deadly COVID 19 infection and helps humanity to rise again.

Conflicts of Interest

Authors declare that there is no conflicts of interest.

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