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CASE REPORT

Intravenous Vitamin C and an Orthomolecular Protocol as Therapy for COVID19: A Case Report

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ABSTRACT

Currently, there is no vaccine or specific antiviral medication for COVID-19. An accessible, effective and safe treatment is urgently needed to save lives and curtail the spreading of this disease. Acute respiratory distress syndrome (ARDS) is a key factor in the fatality outcome of COVID-19. Significantly increased oxidative stress due to rapid release of free radicals and cytokines (cytokine storm) are the hallmark of ARDS, which leads to cellular injury, organ failure and possible death. We report a case in which early use of high dose intravenous vitamin C (HDIVC) seems to be an effective treatment for these patients.

INTRODUCTION

In December 2019, an outbreak of a respiratory illness cause by a novel coronavirus (SARS-CoV-2), officially named Coronavirus Disease 2019 (COVID-19), was first reported in Wuhan, China. COVID-19 rapidly spread worldwide creating a global health emergency. Acute respiratory distress syndrome (ARDS) is a key factor in the fatality outcome of COVID-19. Significantly increased oxidative stress due to rapid release of free radicals and cytokines (cytokine storm) are the hallmark of ARDS, which leads to cellular injury, organ failure and possible death (Cheng, 2020).

With several potential COVID-19 vaccines in the early stages of development, and clinical studies of existing antiviral medications providing inconsistent results, additional compounds with antiviral activity should be considered for adjunctive therapeutic use. Ascorbic acid (AA), commonly referred to as vitamin C, has the required biological activity for this purpose. Due to its strong reducing potential, vitamin C is involved in numerous metabolic processes, including those related to the immune system. Immunocompetent cells such as lymphocytes, neutrophils, and monocytes have an ascorbate concentration 10- to 100-fold higher than the plasma concentration and accumulate it against a concentration gradient (Sorice et al., 2014). The immune system requires high amounts of energy and nutrients. These are needed because its individual components are characterized by high turnover rates, leading to a higher substrate requirement compared to most other body systems (Ströhle, Wolters & Hahn, 2011). The immune system is very complex with multiple metabolic steps and numerous enzymes requiring many cofactors (vitamins, minerals, nutrients). Vitamin C improves the immune system functions, such as antimicrobial and natural killer cell activities, lymphocyte proliferation, chemotaxis and delayed-type hypersensitivity (Wintergerst, Maggini & Hornig, 2006).

We have published a series of case reports on high dose intravenous vitamin C and different viral infections (Gonzalez et al., 2014; Gonzalez et al., 2016; Marcial-Vega, Gonzalez-Terron & Levy, 2017; Gonzalez et al., 2018; Gonzalez, Berdiel & Olalde, 2018), showing a potent antiviral effect of vitamin C. Neither intravenous nor oral administration of high dose Vitamin C is associated with significant side effects.

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CASE REPORT

On June 17, 2020, a 38-year-old woman from Ponce, Puerto Rico, arrived at the Berdiel clinic and presented a sore throat, dry cough, fatigue, a low-grade subjective fever (38.5 C), body pain and a severe headache. These symptoms had been present since June 10, 2020. The patient had no other underlying disease prior to the onset of her symptoms. She presented with a blood pressure of 123/78 mm Hg; pulse of 87 bpm; respiratory rate of 20 breath/min; SPO2 of 90%, and her breathing sound was normal. The laboratory results showed lymphopenia (531 cells/ul); and elevations in aspartate aminotransferase (AST, 78 U/L), alanine amino-transferase (ALT, 41 U/L), C-reactive protein (CRP, 7.8 mg/L), and lactate dehydrogenase (LDH, 295 U/L). A rapid screening test for influenza A and B proved negative. A chest X-ray revealed bilateral perihilar infiltration and ill-defined patchy opacities. Specimens including oropharyngeal swab and sputum were collected for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), and real-time reverse-transcriptase-polymerase-chain-reaction (rRT-PCR) was performed in accordance with CDC guidelines. The 2 rRT-PCR assay confirmed that the patient's oropharyngeal swab was positive for SARS-CoV-2.

The patient was administered high dose intravenous vitamin C (HDIVC) immediately, which consisted of 500cc of lactated Ringer's solution containing 25 grams of sodium ascorbate (pH-neutral form of vitamin C). This was infused in approximately 45 min. The same infusion was repeated for a total of 3 times over 3 days. All of the infusions were clinically uneventful and without discernible adverse effects. She was prescribed Hydroxychloroquine 200mg tid for 10 days; Azithromycin 500mg day 1 then 250mg for 4 days; and an antitussive based on guaifenesin and dextromethorphan (Giltuss) 5ml every 4 hrs.

On the day following the first infusion, the patient noted that her symptoms had improved dramatically. Her headache and body pain were gone. Following the second infusion her appetite also improved. After the third infusion she was advised to continue vitamin C in oral form (3g tid). The patient was also instructed to start taking a high potency multivitamin and mineral (1 qd) and coenzyme Q10 (100mg qd) orally. In addition, she was also prescribed vitamin D3 (10,000IU qd); zinc gluconate (30mg qd); echinacea and elderberry (500 mg bid for ten days, standardized potency). The patient was also advised to remain well hydrated with pure water, and to consume a diet high in vegetables and fruits. She was also advised to restrict sugar and refined, processed foods.

DISCUSSION

We report herein a case of COVID-19 treated with high dose intravenous vitamin C as part of an orthomolecular protocol. In accordance with previous reports, the major symptoms of COVID-19 infection were mainly cough, fever and dyspnea. Our case presented mild fever, dyspnea, headache, generalized body pain and mild hypoxemia. At the same time, the chest X-ray showed bilateral infiltrating pneumonia. The progression of symptoms in this case did not coincide with previous reported cases COVID-19 since in our case there was no progression of most symptoms, even without any conventional antiviral treatment. Despite the fact that pneumonia was present, respiratory failure did not occur. Since an effective medical treatment against COVID-19 remained unknown, we successfully applied high dose intravenous vitamin C and other therapeutic tools against COVID-19.

Vitamin C supplementation has been shown effective, even at low doses between 200 mg and 1600 mg/day orally, in reducing incidence, speeding of recovery, and reducing mortality in those with pneumonia (Hemilä, 2017; Player et al., 2020; Holford, 2020). Carr reported depleted plasma vitamin C status (23 µmol/L) in 44 hospitalized patients with pneumonia; compared to healthy controls (Carr et al., 2020). The most severe patients in ICU had levels of vitamin C averaging 11 µmol/L, which is the level that defines scurvy. This can be considered an infection induced scurvy. Marik reported similar findings in 22 ICU patients with sepsis with levels of 14.1 µmol/L (Holford, 2020; Marik et al., 2017) and recommended giving 1.5 g of vitamin C every 6 hours intravenously (Marik et al., 2017). Marik also reported that all COVID-19 patients in ICUs so far tested by his group had deficient or undetectable levels of vitamin C, sufficient to diagnose scurvy (Marik & Hooper, 2018). Moreover, HDIVC has been used successfully as part of a COVID19 protocol in China as reported by Liu et al., 2020.

CONCLUSION

A variety of studies have shown that high-dose oral supplementation of vitamin C and other essential nutrients such as vitamin D, magnesium, and zinc, can reduce the duration and improve patient outcomes for viral infections and COVID-19. In a hospital ICU setting high dose oral and intravenous vitamin C in combination with a well-established critical care protocol can be used to successfully treat COVID-19, preventing complications such as serious pneumonia, the need for mechanical ventilation, organ failure, septic shock, and death.

Vitamin C has at least 11 antiviral mechanisms and should be the first line of defense against any viral disease including COVID-19. Vitamin C has worked against every single virus including influenza, chikungunya, zika, mononucleosis, and even poliomyelitis. COVID-19 is a very serious contagious disease. But contagion to a virus largely depends on the susceptibility of the host. It is well established that low vitamin C levels increase susceptibility to viruses. All the effects caused by the attack of Sars- Cov-2 on the body involve depletion of ascorbic acid.

Therefore, vitamin C should be included in the treatment of COVID-19, and used as a primary preventative measure for susceptible populations such as the elderly, those suffering from comorbidities, and healthcare workers with higher exposure risks.

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