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Intravenous high dose vitamin C and ozonated saline effective treatment for Covid -19: The Evolution of Local Standard of Care

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ABSTRACT

Introduction

An effective protocol for COVID-19 treatment was started at an internal medicine clinic in Gulf Breeze, FL and began with a local group of physicians using best practices from review of all the literature including the Sars CoV-1 at the turn of this century. There are limited studies on the early outpatient treatment of COVID-19 using intravenous-ozonated saline. The purpose of this report is to describe our experience.

Methods

This is both a qualitative and quantitative perspective analysis and includes a retrospective observational study which was employed from the end of 2019 and progressing forward with the incoming new data.

Results

Using a combination of early treatment strategies including high-dose vitamin C followed by intravenous ozonated-saline, we treated 479 extremely ill COVID-19 outpatients. The population was high risk with most having multiple co-morbidities and many refusing hospitalizations before they presented to us. The first wave (229 patients) was treated between March 2020 through May 2021. The second wave (252 patients) was during the outbreak of predominantly Delta and Lambda variants in Florida. During

the first wave, 38 patients required multiple treatments, 16 had clinical or radiological evidence of covid pneumonitis, 5 required hospitalization, and 3 died after a prolonged hospital stay. The variant wave was more severe with 66 presenting with pneumonia of which 59 required multiple treatments, 6 were hospitalized, and 4 died. In both waves, the average duration of symptoms before receiving treatment was one week. Most patients reported improvement or resolution of symptoms within 24-48 hours of treatment. There were no serious complications related to treatment.

Conclusions

The combination of high dose Vitamin C followed by intravenous ozonated-saline proved to be a safe and effective treatment to relieve the symptoms, lessen morbidity, and shorten the course of COVID-19 in very high acuity outpatients within a high-risk population.

Key Words: COVID-19, early outpatient treatments, ozone, high dose vitamin C

INTRODUCTION

When Sars CoV-2 hit the world in 2019, there was no known treatment with fear and panic dominating all aspects of our communities - locally, nationally, and globally. Many healthcare providers responded in fear refusing to treat anyone with fevers or viral symptoms, closed their offices, or retired. Hospitals set up outdoor testing sites that identified the illness yet sent patients home without treatment unless they were severely hypoxemic and needed hospital admission. Early guidance provided to hospitals dictated the use of ventilators, a closed system, in order to protect hospital personnel from respiratory emissions from the sick. Nebulizer use was prohibited for fear of aerosolizing respiratory droplets and infecting staff and/or other patients. Retrospectively, it was determined that ventilators increased mortality through barotrauma caused by the increased pressures required to maintain oxygen saturations of ventilated patients. Outpatients were largely abandoned by the healthcare system, left to manage their illness on their own, and told to return to the hospital only if they were very short of breath and required oxygen supplementation. As time progressed it became apparent that early treatment protocols were needed.

The recommendations of the global community against early treatment were completely unprecedented. Never in the history of medicine has there been a disease that is not treated with early interventions such as pharmaceuticals, vitamins, nutraceuticals, physical medicine, or even energetics. Even as early studies started appearing showing the effectiveness of repurposed drugs such as hydroxychloroquine, the medical community criticized and failed to recommend and adopt them. It went so far as to demonize these repurposed drugs, including the Nobel prize winning drug Ivermectin, and threaten doctors with unemployment, disciplinary action, and revocation of their licenses and board certification if they prescribed them for patients with symptoms of Covid-19 infection. No attention was being given to the role of nutraceuticals such as vitamin C, Zinc, and D3 in treating infectious diseases.

Confronted with increasing COVID-19 cases and lack of early treatment guidelines or consensus from governing bodies, we looked to historical

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successes in treating viral infections. Intravenous vitamin C has been used in multiple viral infections such as polio, viral hepatitis, measles, mumps, influenza, viral pneumonia and more [1]. Studies suggest that when vitamin C is given intravenously in high doses it functions as a pro-oxidant with a dose related effect [2-5]. It has been proposed that high parenteral doses of vitamin C generates hydrogen peroxide which provides the pro-oxidant effect [2-5]. Armed with this information, in March 2020, we treated 3 patients with 25 grams of intravenous ascorbic acid, 1 ml of B complex, 1ml of methylated B12, 2 grams of MgCl, 10-15 Meq of NaHCO3, and 30-50 mg of zinc. All reported an improvement of symptoms in 24-48 hours. None reported any complications.

In April 2020, as caseload and severity of illness intensified, a decision was made to add an infusion of intravenous ozonated saline after the high-dose vitamin C infusion. The decision to add ozonated saline to the treatment regimen was based on the historical successful use of major autohemotherapy and ozonated saline in the treatment of viral infections [6-8]. Further, a recent publication discussed the possible role of medical ozone in the treatment of COVID-19 [9].

MATERIALS AND METHODS

Patients presenting with symptoms of Covid-19 were either established patients of the Internal Medicine clinic, referred by patients previously treated for Covid at the clinic, or referred by other health care providers and personnel. Patients were included in the statistical analysis if they had a positive Covid test, had classic symptoms of Covid-19 and known exposure, or lost taste and smell without known exposure. The range of symptoms encompassed fever, chills, body aches, fatigue, loss of taste and/or smell, sinus congestion, sore throat, cough, shortness of breath, headache, nausea and/or vomiting, and diarrhea. Informed consent was obtained. All patients were self-pay.

The ascorbic acid mixture is illustrated in Table 1 below. Ozonated saline was prepared using a Longevity ozone generator with a regulator delivering 1/16 liters of O_2 bubbled either in 500 or 1000 ml of 0.45% or 9% saline. The output concentration of ozone was 122 gamma. Baxter bags were used due to their increased elasticity which better accommodated the ozone / oxygen gas. Preparation time was only 8-10 minutes to prepare the 500 ml bag and 20 minutes for the liter bag. Infusion was administered over 15-30 minutes depending on the gauge of intravenous catheter, the caliber of the vein, and volume infused. The ozone/oxygen solution was administered as rapidly as possible due to the short half-life of ozone - 40 min at 20 degrees Celsius, and to avoid degradation of the plastic or formation of halogenated chlorides. Pre-testing for G6PD was not feasible as lab turn around was 7-10 days at local laboratories for out-patients.

Table 1. Vitamin C Cocktail Infusion

25g ascorbic acid	1ml B complex	5 ml 1000 mcg/ml Methyl B12	10 ml MgCl 200mg/ml	10-15 ml 3% NaHCO3	30-50 mg zinc	500-1000ml 0.45% or 0.9% saline

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RESULTS

From March 2020 - May 2021, we treated 224 (five had vitamin C cocktail only) patients with the combination of 25 grams of Vitamin C (plus other cocktail ingredients), and ozonated saline. One hundred and thirteen males and 116 females were treated. Thirty-eight patients required more than one treatment. Of those, five received an ozone infusion only. The average age was 53 (range 15-85) years in females and in males 51 (range 9-98) years. Seventeen males were between ages 60-69 years, thirteen between 70-79, and five were between 80-89. Thirty-two females were between ages 60-69 years, twelve between 70-79, and three between 80-89. Twenty-four presented between day 8 - 14. Four presented with persistent symptoms at 30 days. The majority presented in the first week of symptoms. Sixteen presented with unilateral or bilateral pneumonia by auscultation. Interestingly, only four of those had pre-existing co-morbidities. Twenty-four presented with O2 saturations less than or equal to 95 with one having an 89% saturation.

Table 2. Demographics Wave One

Total Number of Patients (229)	Males (113)	Females (116)
Average Age	51	53
Age range 60-69	17 (15%)	13 (11%)
Age range 70-79	13 (12%)	12 (10%)
Age range 80-	5 (4%)	0

Table 3. Co-morbidities (n = 229)

HTN	DM	Asthma /COPD	Greater than 2 morbidities	Heart Dz	Pulm Dz	Statin Use	ARB Ace Inhib
24 (10%)	9 (4%)	10 (4%)	12 (5%)	10 (4%)	4 (2%)	8 (4%)	16 (7%)

Supplementation Recommendations

We recommended each patient take 10,000 iu of Vitamin D3 [10-13], 50 - 100 mg of Zinc [14-16], Klaire labs Quercetin/Bromelain Forte [17-20] (a combination of quercetin 500mg/bromelain 250mg with vit C 200mg per capsule) 2 twice a day, and Protandim Nrf2 synergizer, clinically proven to reduce oxidative stress [21-26] at doses of one twice a day. Elderly, sicker patients, and those with co-morbidities were also recommended to take lactoferrin 300mg/day based on studies showing efficacy in reducing cytokine storm [26-28].

Medications

Older and higher risk patients were also treated with hydroxychloroquine (12 total). In December 2020 we started prescribing ivermectin 0.2mg/kg for most patients (26 total) – one dose repeated in 3 days. Patients with pneumonia or respiratory complaints were treated with azithromycin or

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doxycycline for out-patient use. Patients with pneumonia were administered intravenous ceftriaxone 1 gm and either methylprednisolone 125mg or dexamethasone 4mg – 6mg. Nebulized budesonide and albuterol, or Symbicort 160 MDI were prescribed for outpatient use in all with pulmonary symptoms, history of lung disease or asthma [29-34].

Wave Two

We had a 4 week pause without COVID-19 cases in June 2021. Wave Two with the Delta / Lambda variants began July 2, 2021. We treated a total number of 252 cases and performed 344 infusions between July 2, 2021 and Oct 8, 2021. Demographics and symptoms were like Wave One; however, patients in general presented with a higher severity of illness. Sixty-six presented with clinical or radiological evidence of pneumonia. The average duration of symptoms before presenting for treatment was one week. We tested three patients for variants and found both the delta and lambda variants in all three. A total of 54 patients required multiple treatments. All patients were given an Rx for Ivermectin at either 0.2mg/kg or 0.4mg/kg to be taken daily for 5 days. Hydroxychloroquine was rarely given. Aspirin or low molecular weight heparin was prescribed for those that were deemed at higher risk for venous thromboembolism. The rest of the medications remained the same as Wave One. The nutritional supplements were the same with the addition of CDP choline in cases of pneumonia. The use of CDP choline was based on a webinar by Dr. William Shaw of the Great Plain's Laboratory in March 2020. He emphasized the Sars CoV-2 upregulation of the LpPLA2 enzyme in the production of inflammatory fatty acids and subsequent over production of ROS. CDP choline provided a negative feedback/partial blockade of the PLA2 enzyme [35-37].

Table 4. Demographics in 252 patients treated in Wave 2

Total Number of Patients	Males	Females
	113 (45%)	139 (55%)
Average Age	49	51
Age range 60-69	18	26
Age range 70-79	11	7
Age range 80-95	4	4

Table 5. Comorbidities in 258 patients treated in Wave 2

HTN	DM	Asthma/COPD	Greater than 2 co-morbidities	Heart Dz	Pulm Dz	Statin Use	ARB Ace Inhib
32	21	9	12	18	0	13	20

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Table 6. Comparison Wave One and Two

	Covid Wave One	Covid Wave Two
Total Patients	229`	250
Total Infusions	299	334
Highest Age Male	89	95
Highest Age Female	85	87
Mean Age	56	50
Youngest Age Male	9	18
Youngest Age Female	12	18
Vitamin C Only	5	0
Ozone Only	5	80 – repeat, not initial infusion
Pneumonia	16	66
HTN	27	35
Diabetes	9	23
Heart Disease	10	18
Statin Use	8	14
Ace/Arb Use	16	23
Asthma/COPD	10	17
Pulmonary Fibrosis	2	0
Greater than 2 Morbidities	12	16

Results Wave One

Most reported complete relief of their symptoms within 24-48 hours. Thirty-eight patients required more than one infusion for relief of symptoms, resolution of pneumonia or hypoxemia. Only 4 required more than 4 treatments. In general, after treatment O2 saturation increased on average 3%. Five patients required hospitalization. All hospitalized had co-morbidities – two of which were on home oxygen for pulmonary fibrosis. All fatalities had pre-existing conditions and were advanced age except a 46-year-old with pulmonary fibrosis already on continuous oxygen therapy. We only sent people to the hospital when we could not maintain oxygen saturation greater than or equal to 90%. We were unable to obtain home O2 for anyone on an emergency basis (average time was 72 hours even with Medicare patients). Local oxygen suppliers refused to provide home oxygen on a cash basis. Only much later did we learn that patients could tolerate much lower oxygen saturations and that it would have been better to not send them to the hospitals. Hospitals' mortality rate was high due to the use of remdesivir (causing kidney and multi-organ system failure) and ventilators.

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Results Wave Two

Most patients reported relief of symptoms within 24-48 hours. Fifty-four patients required more than one infusion for relief of symptoms, resolution of pneumonia or hypoxemia. Only 1 required more than 4 treatments. In general, after treatment O2 saturation increased on average 3%. Six patients required hospitalization for hypoxemia. There were 4 deaths. Four out of six of the patients that were hospitalized had multiple pulmonary emboli. All of the deaths were older than 60 except one and all had co-morbidities. We lost no one who presented early in the course of their disease on Wave One or Two.

Side Effects

Occasionally people expressed a feeling of lightheadedness, flushing, worsening cough, or pleuritic chest pain which resolved quickly following completion of the therapy. The only other adverse effects were pain at the injection site and a few reported mild thrombophlebitis which resolved on its own not requiring any additional treatment. Complications of administering the Vitamin C were chills, warm flushes, and nausea, all of which resolved with a slowing of the infusion rate and anti-emetics if needed. Two had mild hemolysis from G6PD deficiency that they were unaware of.

Sars CoV-2 and Oxidative Stress

An imbalance between pro-oxidant and antioxidant activity promotes viral replication and produces oxidative stress [38-40]. Sars CoV-1 and CoV-2 both showed an overwhelming production of reactive oxygen species (ROS) along with disruption of antioxidant defenses. In addition, hypoxemia produces even more superoxide radicals. Inflammation caused by oxidative stress was the primary mechanism of organ damage manifested by patients with COVID-19 with ARDS [41-45]. In addition biopsies of lung tissue showed impaired Nrf2 function, more so in the aged population [45]. Elevated hsCRP levels, an indicator of inflammation and oxidative stress, were elevated in more serious cases of COVID and a prognostic indicator in patients presenting with COVID-19 peumonia [46-47]. Excessive release of inflammatory mediators triggered the “cytokine storm” which then produced the vicious cycle of further oxidative stress and inflammation. This ultimately caused ARDS and multi-organ system damage in many patients leading to their demise. Increased levels of cytokines such as Monocyte Chemotactic Protein 1 (MCP1), IFN-γ-inducible protein 10, IFN-γ, IL-1β, IL-6 and IL-18, have been found in lymphoid tissues, blood and lungs of COVID-19 patients, pointing toward an increased activity of the NLRP3 inflammasome that was found in leukocytes of affected lung areas in patients with fatal COVID-19 pneumonia [41][45-53].

Oxidative stress is the underlying pathological process contributing to most diseases such as diabetes, hypertension, chronic obstructive pulmonary disease, obesity, cancer, AIDS and cardiovascular disease [49-53]. These are age-related comorbidities that were prognostic indicators of worsening symptoms and prognosis with Covid-19. One of the mechanisms associated with age related susceptibility to disease is decreasing activity of Nrf2 with age [54-58]. Nrf2 activation increases production of SOD, catalase, and glutathione which neutralize reactive oxygen species (ROS) and increase the anti-oxidant response element especially through the anti-oxidant activity of glutathione [45]. In fact, the results of one study on gene expression of type II pneumocytes, revealed that multiple molecules with anti-oxidant activity were downregulated, with superoxide dismutase 3 (SOD3) being the most downregulated gene in the elderly subjects [53]. This illustrates that there is a two-fold issue with the Sars CoV-2: decreased host ability to combat

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oxidative stress with age and co-morbidities, along with a massive increase in production of ROS.

Mechanisms of Action of Medical Ozone

The use of medical ozone dates to the mid -19th century. It was used in the United States as far back as 1885. It was used in WWI to treat wounds. Traditional uses of ozone in medicine were for infectious disease, cardiovascular disease, peripheral vascular disease and limb ischemia, orthopedic, dentistry, and as a disinfectant [59]. Ozone has been used to treat Covid-19 successfully here in the US, as well as in Spain, Italy, China, and South America [9][60-63].

Ozone is a natural substance that is released by the white blood cells and converted to hydrogen peroxide. Ozone, triatomic oxygen, exists in various mesomeric (resonance) states and is 10-15X more soluble in water than is diatomic oxygen [59]. While ozone's effects are well known, its mechanism of action remains unclear. When ozone is dissolved in plasma, it reacts with biomolecules starting a chain of reactions and then disappears. Initially ozone functions an oxidant creating ROS (primarily hydrogen peroxide) and "ozonides" (hydroperoxides and aldehydes). Once in contact with bodily fluids it immediately solubilizes and effects are likely mediated via an induced resonance state in water, which accounts for the body-wide actions. While diatomic oxygen is an avid electron scavenger, dissolved ozone is an uber energy sink that draws electron-equivalents from biomolecules leaving them in an energy-poor oxidized state. This results in conversion of polyunsaturated fatty acids (PUFAS) in plasma into various lipid oxidation products: lipoperoxyl radicals (lipid oxidation products – LOP's), hydroperoxides, malonyldialdehyde, and 4-hydroxy-2,3-transnonenal (HNE) and more. These LOP's are responsible for the release of nitric oxide in the endothelium, activation of Nrf2, and modulation of the immune response [59][64-71].

The energetics basis of ozone therapy are extensively documented in the literature specifically, in Sars CoV-2 ozone is directly virucidal, can provide additional oxygenation of the tissues bypassing the lungs, activates the Nrf2 pathway, inhibits production of inflammatory mediators (interleukins, cytokines, TNF alpha, etc.), inhibits viral replication, upregulates production of heme oxygenase one (HO-1) in endothelial cells, stimulates production of 2-3 DPG thus shifting the oxy/Hgb curve to the right, and provides additional immune modulation [59][64-70].

Inhibits Viral Replication/Virucidal

Although ozone is directly virucidal in vitro, how much of a direct virucidal effect is happening in vivo is questionable because of the host's antioxidant defenses and that most of the viral load is intracellular. However, ozone is capable of directly inactivating many viruses (Norwalk virus, Hepatitis A virus, poliovirus, and MS3 colofagus) [69, 70]. Ozone is capable of oxidizing the viral membrane glycoprotein which damages the viral capsid and disrupts viral reproduction by peroxidation. The virus needs the reduced form to enter cells and infect them [69, 70]. Cytomegalovirus loses infectivity if its "thiol" or sulfhydryl group is oxidized. Coronaviruses, as well as Ebola virus, have regions rich in cysteine and tryptophan in their membrane S-protein (spike-S). It is postulated that in Covid -19, ozone would directly oxidize the "thiol" groups of cysteine and tryptophan thus inactivating them and directly blocking their cellular fusion [69, 70]. The weak enzyme coatings on cells make them vulnerable to invasion by viruses, but also make them susceptible to oxidation and elimination from the body, which then replaces them with healthy cells. LOP's also

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stimulate stem cell release from the bone marrow [70].

Increased Tissue Oxygenation

One of the more important applications of ozone in treatment of Covid-19 appears to be the ability to increase oxygenation to the tissues directly and via the increase in 2,3 DPG and the resulting shift in the oxy/Hgb curve to allow greater delivery of oxygen to tissues and organs. This is especially important in the case of pneumonia and ARDS when gas exchange in the alveoli is limited. It also stimulates the release of nitric oxide in the endothelial cells [64, 65].

Antioxidant and Immunomodulatory Effects

Arguably one of the most important effect of ozone therapy is the activation of the Nrf2 pathway thus invoking the antioxidant response element, reducing the severe oxidative stress, and modulating the immune response. Nrf2 activates the transcription of over 500 human genes most of which are cytoprotective. Activation of Nrf2 leads to detoxification and excretion of toxic metals and xenobiotics. It stimulates highly anti-inflammatory changes, stimulates autophagy, and stimulates mitochondrial biogenesis working closely together with the Nrf1 pathway [61]. Raising Nrf2 activity is shown to prevent and treat a host of chronic inflammatory diseases such as cardiovascular disease, pulmonary diseases, liver disease, diabetes, sepsis, kidney disease, autoimmune diseases, HIV/AID's, epilepsy, and cancer prevention. Nrf2 is naturally activated when the body needs repair, detoxification, has an oxidative stress, infectious insult etc. However, as stated above Nrf2 function declines linearly with age, thus oxidative stress increases with age. Nrf2 activation is the principle pathway our body uses to reduce oxidative stress and restore homeostasis. It accomplishes this by increasing HO-1, quinone oxidoreductase gene (NQO1), superoxide dismutase (SOD1 and SOD2), catalase, glutathione, NADPH, thioredoxin, peroxiredoxin-1 and -6 and other genes that encode for removing toxic products of lipid peroxidation [71-76].

The anti-inflammatory effects are wide, but one of the most important in treatment of Covid-19 is the lowering of NF-kB. The interaction between Nrf2 and NF-kB is complex and not fully understood, but they keep the cytokine balance in check. Ozone is capable of blocking or lowering NF-kB, which in turn lowers activity of inflammatory mediators such as cytokines, chemokines, adhesion molecules, and COX-2, MMP-9, and iNOS. Interleukin 1-B, IL-6, TNF-a which are the principle inflammatory mediators seen in Sars CoV-2 are lowered with ozone therapy. In addition, anti-inflammatory cytokines Il-4 and IL- 10 are stimulated. Highly sensitive CRP, an inflammatory marker that is elevated in Covid-19 patients, is lowered dramatically with ozone therapy [21, 22, 25, 45, 69, 70, 72].

Ozone Preconditioning – New Insights into Mechanism of Action of Ozone

Ozone preconditioning (PC) comprises two opposing aspects: the immediate consequences of the toxic assault and the protective response initiated by the body to counteract its noxious influence. A dramatic display of this preconditioning effect is seen with ozone, possibly the most powerful PC agent yet discovered. Ozone's primary effect is induction of brief oxidative injury, especially on membrane lipids, which impairs mitochondrial energy generation and leads to formation of reactive oxygen and nitrate species which compound cellular injury. Such oxidative insults on the cell machinery trigger release of pro-inflammatory cytokines that elicit an immune response further aggravating cell damage. The cascade of events induces a self-amplifying spiral of deterioration in cells which is then counterpoised by an infusion of

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energy into the blood resulting in the first window of PC protection [71].

One of the most striking downstream effects of ozone PC is modulation of the inflammatory response. Intracellular inflammation is mediated by the NLRP3 inflammasome, a multiprotein complex that integrates stress signals from the extracellular fluid space, so-called pathogen and damage-associated molecular patterns, and internal stress signals such as reactive oxygen species related to mitochondrial dysfunction [71]. Stress signals lead to NLRP3 activation with release of proinflammatory cytokines IL-1B and IL-18 and caspase-1 dependent apoptosis (programmed cell death). Ozone PC asserts anti-inflammatory and anti-apoptotic effects via suppression of NLRP3 inflammasome activity. This effect can only be explained by the direct infusion of energy currents into mitochondria. Since abnormal inflammasome activation is a prominent feature of various chronic conditions like Alzheimer's, autoimmune disorders, cardiac and renal disease, as well as acute inflammatory syndromes like Covid-19, it has been suggested that ozone PC could modulate disease activity in these circumstances [71] [77-79].

Given the presence of a blood-borne energy field that drives all functional processes in the body, it stands to reason that oxidative injury and its deleterious consequences, or allied conditions like inflammation, must represent primary energy deficiency states. Equally, associated symptoms, the chest pain of angina pectoris or neurologic deficits of stroke for example, must be conceived along similar lines. To better understand the dynamics of the preconditioning (PC)-associated corrective physiology we examine another common and unexplained phenomenon known as ischemia-reperfusion injury (IRI). IRI, like PC, has been a topic of great interest in recent years. Reperfusion injury refers to a cascade of catastrophic events set into motion by impaired energy dynamics which arise because of attempts to intervene in dire clinical situations like myocardial infarct, stroke, or organ failure. In all cases, whether as a consequence of angioplasty, thrombolysis, surgical bypass, or transplantation, a prolonged period of flow interruption between the vascular compartment and affected organ had been present and, upon reestablishment of flow, a cascade of adverse events ensues. While the cellular and molecular events related to IRI vary from organ to organ, underlying dynamics are the same. The primary dysfunction involves a maladaptive interplay between the vascular and intracellular fluid compartments [71] [77-79].

The events associated with IRI are exactly those which PC is known to prevent: cell death, disruption of tissue viability and architecture, accumulation of fluid and/or blood in the tissue spaces, and loss of organ function. There are localizing biochemical abnormalities depending on which organ is affected. In the heart arrhythmias and contractile dysfunction often occur. The spiral of deterioration begins after blood flow has been re-established and, depending on the severity of injury, evolves over hours to days. IRI is said to occur in about 20-60% of rescue attempts depending on the type of intervention, involved organ, and preexisting status of the patient. The appearance of IRI counteracts any intended benefit of the procedure and, moreover, may precipitate organ failure or death. IRI was first described in 1960 after prolonged coronary artery ligation in dogs. Contrary to expectations, reperfusion seemed to accelerate the extent of heart damage. Histologic changes after 30-60 minutes of IR were similar in severity to those observed after 24 hours of permanent occlusion [71] [77-79].

For decades it remained controversial whether reperfusion of a blocked vessel caused tissue

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injury. Evidence now indicates it promotes additive damage upon pre-existing ischemic injury. There are no reliable pharmacologic therapies by which to lessen its effects. In a 2005 study, after stents were deployed across occluded coronary artery segments, researchers applied a post-conditioning sequence using repetitive inflation deflation cycles with a coronary angioplasty balloon and observed a 36% decrease in the size of the affected area. Such results indicate that the effects of IRI can be mitigated. It also points to the fact that the beneficial effects of PC and the detrimental effects of IRI revolve around a single primary phenomenon: the disposition of energy. Many studies substantiate the effects of ozone PC in preventing or ameliorating IRI-induced tissue injury. Studies support the equivalency of ozone PC and ischemic PC [71, 77-79].

Aether, energy & energy dynamics are extensively discussed in a three-part series by KE Thorp et al and are intimately germane to COVID-19 and ozone therapies. A hierarchical level of energy is required to maintain life and this is derived from multiple different hierarchical sources. The main pathology of both COVID-19 illness and that of COVID-19 vaccine injury can all be traced back to energy dynamics. There is a profound energy requirement at the molecular, nuclear, cytoplasmic and blood levels in the entire human body and this is often overlooked in terms of disease processes. Every single biomacromolecule including hemoglobin, DNA, RNA, proteins, lipids require energy to fold and unfold into various shapes to support physiologic functions. When energy sources are diverted from routine housekeeping energy requirements of the cell to make spike proteins in every cell of the body then energy deficits occur. For example, consider just one molecule of hemoglobin that requires energy to change shapes from oxyhemoglobin to carboxyhemoglobin as the molecule travels from the pulmonary capillary downstream to the tissue capillary level [71] [77-79].

DISCUSSION

The main findings of this study underscore exactly what Peter McCullough testified to in the Texas Senate “Lesson Learned”. Dr. Peter McCullough told the Texas Senate that it is absurd to have political operatives and bureaucrats mandate standard of care on a global or even national level. This is doomed to failure; excess morbidity and mortality always ensue. Standard of care should ALWAYS be defined locally at the ground level with physicians and healthcare providers in local communities determining the best practices for their patients and then sharing with other experts doing the same. This is exactly what the lead author of this report did in late 2019 and early 2020 at the onset of the pandemic. Global / national / regional bureaucrats, including the medical industrial complex, pretend to be clinicians and pretend to have the same level of knowledge of the ground level treating physicians. This is a grave and morbid mistake. Having these bureaucrats determine standard of care resulted in the greatest disaster in the history of medicine! Not only were there untold unnecessary deaths from Covid -19 infection, but there have also been tens of millions killed and injured with an absurd experimental gene therapy that profited only the wealthy corporatists. Unfortunately, the deaths and morbidity continue from these experimental shots [80, 83].

This is exactly why the “third world countries” fared so much better during the COVID-19 pandemic; the local on the ground physicians rejected the ridiculous narratives of the global elite that were planned only to benefit the elite with massive pharmaceutical profits. Over 500 new billionaires have been created since the onset of the pandemic; about a new billionaire every 24 hours [81].

The other findings of this study that are extremely important are that there are safe, effective and

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inexpensive nutraceuticals, natural substances, vitamins and repurposed drugs are synergistic clinically and effective at treating the illness, thus reducing the morbidity and severity of the disease. Leading experts including Drs. Zev Zelenko, Pierre Kory, Peter McCullough, Ben Marble, Lee Merritt, Brian Ardis, Paul Marik, and many more now all agree that early outpatient treatment for COVID-19 would have saved over 95% of the 635,450,458 COVID-19 cases, 6,593,655 COVID-19 deaths, and tens of millions of injuries [82]. The only problem with the hundreds of years of using these safe, effective and cheap medications is they do not create wealth for the medical industrial complex. Medical ozone is a promising treatment for infectious diseases along with other diseases of aging. It is long overdue to be recognized and studied along with pharmaceuticals in our medical institutions. It is time to stop letting the medical industrial complex dictate the standard of care and to base treatments on scientific, unbiased research and therapeutic efficacy. Medical ozone belongs in mainstream medicine based on the scientific literature.

CONCLUSIONS

Intravenous high dose ascorbic acid infusion followed by ozonated saline, along with targeted supplementation and medications aimed at reducing viral entry, viral replication, inflammation, and oxidative stress prove to be an efficacious therapeutic treatment for Sars CoV-2 with no toxicity. Our data indicates that this treatment is highly effective early in the course of disease to reduce symptoms and shorten the course of symptomatic disease. It proved to be an effective treatment even when patients presented later in the course of the disease and was particularly helpful in treating clinical Covid-19 pneumonia. Due to the multiplicity of actions of the Sars CoV-2 virus, a multifactorial approach is necessary to reduce morbidity and mortality. Earlier treatment is the most effective and efficient. Further studies should be done in both the out-patient and in-patient setting. Due to the ability of ozonated saline to oxygenate the blood, bypassing the lungs, its use should be considered in the ICU setting on ventilator patients with multi-organ system failure.

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