Re: Acetyl-Glutathione and COVID-19

My name is Ted Keller, the owner of the Maplewood Company, one of *Townsend Letter*'s advertisers for many years. I would like to provide additional information about acetyl-glutathione, which was mentioned in "Letter from the Publisher" (May 2020).

I was the first company to introduce acetyl-glutathione as a readily available, orally absorbable glutathione supplement to the world market in 1998. I have sold many thousands of bottles of this supplement and have tremendous amount of feedback from users.

With regard to COVID-19, Dr. Collin's column indicates that the use of high-dose intravenous vitamin C, to control interstitial inflammation, is essential. As you may know, acetyl-glutathione given orally in high doses seems to do that as well. I have recommended doses of 1 gram to 1.5 grams orally daily as the lungs, liver, and kidneys are major consumers of glutathione; and I believe this protects those organs from inflammatory damage. Ibuprofen, as in some recent studies, exacerbated the damage of the virus and not coincidentally depletes glutathione. Alcohol and acetaminophen, as well as many pharmaceutical drugs, also rapidly deplete glutathione (GSH).

Glutathione deficiency contributes to oxidative stress, which plays a key role in aging and pathogenesis of many diseases – for example, Alzheimer's, Parkinson's, liver disease, cystic fibrosis, sickle cell anemia, HIV/AIDS, cardiovascular disease, stroke, kidney disease, and diabetes.

This past decade witnessed the discovery of novel roles of glutathione in signal transduction, gene expression, apoptosis, protein glutathionylation, and nitric oxide metabolism. Glutathione is essential for the activation of T-lymphocytes and polymorphonuclear leukocytes, cytokine production, and for mounting a successful immune response when the host is immunologically challenged.

Glutathione (GSH) has been shown to inhibit the following viral conditions: herpes simplex viruses 1 and 2, herpes zoster, HPV, influenza viruses, and possibly hepatitis C.

Patients in the late 1990s that did not respond to conventional hepatitis C protocols were literally kept alive by taking high doses of acetyl-glutathione until the newer antiviral meds were available. I believe COVID-19 infections would respond to this supplement as well. I have personally been taking high doses of acetyl-glutathione for 22 years, and I am submitting personal testimonial of my experience with this regimen. Maintaining glutathione levels is necessary in the slowing of the aging process and extending longevity. GSH has been shown to maintain telomere length.

Accumulated toxins must be eliminated to ensure a long and healthy life. One of the past issues of the *Townsend Letter* suggested that the amount of pesticides and the herbicide glyphosate in our food and water has become problematic. Not only is glyphosate a toxin, but it is more insidious as it destroys the ability to synthesize GSH.

Cardiovascular inflammation, I believe, is the cause of plaque buildup in the veins and arteries. GSH is the only supplement I know that can reverse atrial fibrillation in non-damaged hearts. GSH can, over time, reverse COPD symptoms as well – along with cessation of smoking and regular exercise. Nothing else seems to do so.

Glutathione supports hormone synthesis, and women with higher GSH levels suffer less with menopause symptoms. Women in third world countries have fewer problems with menopause, and I believe that is due to higher blood levels of glutathione, as opposed to women in highly polluted, industrial countries.

Acetyl-Glutathione Personal Testimony

I did not invent acetyl-glutathione; however, I have taken acetyl-glutathione longer than anyone on the planet, 19 years to be exact, and I am the first person to bring this product to the market.

I am 74 years old, male, 5'9", weigh 165 lbs, 34" waist. I have normal blood pressure, normal blood sugar, normal free hormones (same levels as a 40-year-old male), suffer no erectile dysfunction, no joint pain, no loss of bone or muscle mass, normal telomere length for 40-year-old, normal growth hormone levels, and normal thyroid levels. I have had no bone or muscle loss in the 19 years. I train in martial arts and regularly spar with men 50, 40, and 30 years younger than me, and I can compete. I have 27% less heavy metal concentration on average and no calcification of coronary or carotid arteries. I have not had any cold sores in 22 years. As an aside, people with herpes simplex 1 are more prone to Alzheimer's disease, according to the Cleveland Clinic. I have no macular degeneration, better hair growth, normal hearing, and few eyeglass prescription changes – two in 22 years. I have longer eyelashes, fewer wrinkles and younger looking skin. I require no sunscreen when exposed to the Colorado sun; I don't burn. I have not had any significant dental work in 20 years; my gums are in excellent condition. No COPD symptoms even after smoking for 25 years.

Before starting the daily dose of acetyl-glutathione, these were the problems that I faced: blood sugars slightly above normal, blood pressure slightly elevated, gout, occasional atrial fibrillation, elevated cholesterol, elevated triglycerides, occasional insomnia, the beginning of COPD problems, low energy, adrenal fatigue, 3 pm crash daily, no physical stamina, heavy metal contamination, one or two cold sore outbreaks per year, very thin eyebrows and eyelashes, and soft, receding gums.

I attribute my excellent health to the acetyl-glutathione supplement!

Ted Keller, RPh
Maplewood Company

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Considerations for the Use of etyl-Glutathione or Its Precursor in COVID-19 Patients

by Zina Kroner, DO

I would like to propose a simple, safe, inexpensive, readily available, adjunctive treatment for both hospitalized and non-hospitalized COVID-19 patients: the utilization of glutathione or its precursor, N-acetylcysteine (NAC), already in all hospital formularies. Many physicians and institutions are already on the forefront of medicine and have been lauded for their incorporation of trials utilizing potentially life-saving medications as well as integrative treatments, including intravenous vitamin C, zinc, melatonin, thiamine, etc. Its safety profile combined with the research studies to support its use can make this a key component of our COVID-19 toolkit.

High Glutathione Reductase Levels in COVID-19 Patients

An elevated glutathione reductase level in the blood is a clue that the body's antioxidant defense system is taxed. Glutathione reductase (GR) is an enzyme that recycles oxidized glutathione back to the reduced form. An infection such as COVID-19 depletes glutathione and obviates its need from an exogenous source. GR tends to be elevated in COVID-19 patients, as demonstrated by a study from Shanghai, pre-printed in March 2020, where clinical as well as hematologic markers were followed in 198 hospitalized COVID-19 patients in a single center. This is novel research as this is not a typically ordered test in the US but being privy to these results can help us to implement a safe and effective adjuvant and novel therapy for COVID-19.[1]

COVID-19 and Reactive Oxygen Species

Cytokine storm, hypoxemia, inflammation, and mechanical ventilation have been shown to increase the generation of a pro-oxidant state.[2,3] GR is necessary for the immune system to work effectively. The higher the level, the greater the body's attempt at a compensatory reaction to oxidative stress. COVID-19 is indeed triggering an increase in reactive oxygen species (ROS). The increase in glutathione reductase that we see in the Shanghai study is considered, by the authors, an adaptation of the body's antioxidant defense against an increased production of ROS.[1] Glutathione or NAC can potentially replete this deficiency.

Glutathione Levels in Those with Metabolic Syndrome Is Essential

It is know that diabetics and those with metabolic syndrome, a category of patients at greater risk of getting complications from COVID-19, are known to have a lower baseline glutathione level and thereby utilize their antioxidant defense system (glutathione) at a greater rate due to their enhanced production of ROS. As their antioxidant defense system gets hyper-utilized and is ultimately ineffective, they wind up having a low glutathione content in erythrocytes. Therefore, diabetics have a baseline strain on their antioxidant defense system.[4] This low baseline glutathione state, combined with the pro-oxidant stresses of COVID-19, puts them at a greater disadvantage of being able to deal with the virus.

Glutathione Depleted by Acetaminophen Use

Ibuprofen is touted to have a controversial effect on COVID-19 patients, and hospitals are more likely to prescribe acetaminophen, which is known to deplete glutathione levels; a further dampening of the patients' glutathione levels can occur with acetaminophen use. NAC will help the liver regenerate glutathione and neutralize the toxic breakdown products formed by even small doses of acetaminophen.

Pulmonary Fibrosis Helped by Glutathione Precursor

COVID-19 patients suffer from significant pulmonary fibrosis, a diagnosis with a poor prognosis; NAC, a glutathione precursor, has been used as a treatment for pulmonary fibrosis with some success over the years. A July 2019 study, which was a systematic review and meta-analysis, where the efficacy and the safety of NAC was evaluated for the use of idiopathic pulmonary fibrosis (IPF) demonstrated that NAC improved the FVC and DLCO, which demonstrated a decrease in the decline in lung function, and also slowed the progression of fibrosis, evidenced by the improvement in PaO2.[5]

Glutathione and the Immune System

Glutathione has been shown to have a direct effect on the immune system. It has been shown to substantially increase natural killer cells and proliferate lymphocytes.[6,7] This is crucial as lymphocytes have been shown to be

low in COVID-19 patients.[1] Glutathione reductase and lymphocyte levels are inversely proportional in the Shanglai study. We can reverse this somewhat by glutathione repletion.

Should Physicians be Recommending Glutathione or its Precursors to COVID-19 Patients?

The body needs help obtaining this nutrient from an exogenous source during a time like this. These patients already have a propensity for a low glutathione status, as all but 6 percent have either a pre-existing metabolic syndrome or other conditions that lower one's antioxidant status and therefore increases inflammatory markers. The infection itself propagates ROS, and as evidenced by the Shanghai study, the body works hard to compensate for this by increasing the glutathione reductase levels. Glutathione is lower in those who are hypoxic, on a ventilator, getting acetaminophen, and in a cytokine storm.

Glutathione can be administered in its most effective way, which is intravenously. Few patients will have access to such a treatment. The second-best way is the nebulized form, which although is ill-advised in an inpatient setting due to aerosolization, it can be done in an outpatient setting. There is a minute potential for bronchospasm in some asthma patients, so care must be taken. However, a safe, cheap, and easy alternative is a precursor to glutathione, NAC. It can be used in a capsule form, thereby foregoing the sulfur-like taste of the liquid acetylcysteine. It is a mucolytic,[8] has shown benefit in pulmonary fibrosis, helps to reverse toxic effects of acetaminophen, has promise in decreasing ROS, and can increase lymphocyte proliferation and NK cells. I urge physicians to consider embracing this addition to the cocktail of medications and supplements that COVID-19 patients currently receive. The use of NAC or nebulized glutathione for COVID-19 patients alone will not be an ultimate game changer in terms of one's clinical status, but there certainly a fighting chance by enhancing their antioxidant defense system.

References

1. Min Cao, Dandan Zhang. Clinical Features of Patients Infected with the 2019 Novel Coronavirus (COVID-19) in Shanghai, China. medRxiv 2020.03.04.20030395.
2. Tamura DY, et al. Acute hypoxemia in humans enhances the neutrophil inflammatory response. Shock (Augusta, Ga.), 17 (2002), pp. 269-273.
3. Sarma JV, Ward PA. Oxidants and redox signaling in acute lung injury. Comp Physiol. 2011;1:1365-1391.
4. Ganwik K, et al. Metabolic Disorders: Pathogenesis, Prevention, and Therapeutics. Markers of Antioxidant Defense in Patients with Type 2 Diabetes. Oxid Med Cell Longev. 2016; Article ID 2352361.
5. Feng F. Efficacy and safety of N-acetylcysteine therapy for idiopathic pulmonary fibrosis: An updated systematic review and meta-analysis. Exp Ther Med. 2019 Jul;18(1):802-816.
6. Dröge W, Breitkreutz R. Glutathione and immune function. Eur J Clin Nutr. 2018 Jan;72(1):105-111.
7. Sinha R, et al. Oral supplementation with liposomal glutathione elevates body stores of glutathione and markers of immune function. (Abstract) Eur J Clin Nutr. 2018 Jan;72(1):105-111.
8. Aldini G, et al. N-Acetylcysteine as an antioxidant and disulphide breaking agent: the reasons why. Free Radic Res. 2018 Jul;52(7):751-762.

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