EC EMERGENCY MEDICINE AND CRITICAL CARE
Conceptual Paper

Emergency Medicine and Glutathione

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Received: February 23, 2019; **Published:** March 28, 2019

Glutathione is a tripeptide (L-γ-glutamyl-L-cysteinyl-glycine) found in every cell in high levels, 5 millimolar, which is as high as potassium, glucose and cholesterol [1]. The compound is synthesized in the cell utilizing the glutamate, cysteine, and glycine amino acids. Of course, it also requires the mitochondrial ATP and the methylation processes to achieve it. Most glutathione is found intracellular, although it also functions in the cellular membrane and plasma. The plasma concentration being largely contributed to by the liver's excretion, although to a lesser extent by the kidneys.

It is considered by some to be one of the most important compounds in the body. The reason being is that it is involved in more functions than most other compounds.

Historically, it was only recognized for its anti-oxidant properties. Glutathione plays an important role in cell metabolism, transportation of amino acids, differentiation, proliferation and apoptosis. It plays a role in hormone regulation and nitric oxide regulation. It is important to both the respiratory system and the immune system. It protects the mitochondria and telomeres, as well as transported across the mitochondrial inner membrane to provide even more functions. From the liver, it is exported into the cardiovascular system and the bile where it is responsible for even more functions.

However, even as an anti-oxidant, it does more than any other anti-oxidant compound. It responds to all types of toxic free radicals. Whereas most anti-oxidants respond to one type. Unlike other anti-oxidants, it then re-stabilizes itself so that it can function again. It will also help to restablize other anti-oxidants once they have provided the electron for the free radical, thus allowing them to function again as well. It functions within the cell; the cellular membrane and extra-cellularly.

While low levels of glutathione have been correlated with virtually every disease and dysfunction, either as the cause or as a side effect, glutathione is also important to numerous medical emergencies. Low levels of glutathione are associated with mortality.

Glutathione's capacity to detoxify exogenous toxic compounds is important in emergency room protocol.

Studies research the benefits of glutathione in emergency patients with multiple organ failure in septic shock found that high doses of N-acetyl-L-cysteine (NAC) revealed a significant decrease in the peroxidative stress of the patients [2]. Or with chemotherapy to prevent poisonous side effects [3].

Most of the medical emergency research regarding glutathione, is in reference to acetaminophen. The liver utilizes the P450 enzyme to convert acetaminophen to a highly toxic metabolite, N-acetyl-p-benzoquinoic imine (NAPQI). The resulting compound is neutralized when the liver combines it with glutathione. If, however, glutathione resources are depleted, the compound becomes toxic, damages the liver, and interferes with the DNA [4]. Acetaminophen overdoses can be eliminated by injecting N-acetylcysteine (NAC), the precursor for glutathione, or glutathione. The challenge with the N-acetylcysteine is that it takes about 8 hours for sufficient synthesis of glutathione to resolve the problem. However, glutathione injections can work immediately.

However, glutathione can also be used for other toxins, i.e., heavy metal toxicity from mercury, arsenic, cadmium, chromium, etc., alcohol toxicity, and persistent organic pollutants [1].

Oral glutathione is not an option as glutathione breaks down in the stomach's hydrochloric acid, leaving the unstable cysteine free to transport out of through the GIT. Even if the glutathione did not metabolize, it is far too large to cross through any of the cellular transport mechanisms. Although the liver and the kidneys do have the capacity to excrete glutathione into the vascular system.

However, when immediate measures are required to detoxify the blood in emergency room situations, a glutathione injection is a major consideration.

Bibliography

1. Joseph Pizzorno. "Glutathione". *Integrative Medicine (Encinitas)* 13.1 (2014): 8-12.
2. Ortolani O., *et al*. "The effect of glutathione and N-acetylcysteine on lipoperoxidative damage in patients with early septic shock". *American Journal of Respiratory and Critical Care Medicine* 161.6 (2000): 1907-1911.
3. Glutathione.
4. Glutathione combats drug overdose, pg. 19.

Volume 3 Issue 4 April 2019