Glutathione and Parkinson's

Parkinson's disease is a progressive neurodegenerative disorder that is associated with the presence of Lewy bodies and the loss of dopaminergic neurons within the substantia nigra. We now know that oxidative stress is a significant contributor to the pathogenesis of Parkinson's disease. Additionally, research suggests that glutathione, a thiol tripeptide that is involved in the scavenging of reactive oxygen species, may play a crucial role in protecting dopaminergic neurons from oxidative stress. As a result, glutathione is currently being investigated as a potential therapeutic agent in the treatment of Parkinson's disease.

The reduced form of glutathione plays a critical role in the substantia nigra, where it serves as a mediator of oxidative stress. Research demonstrates lower levels of glutathione in the substantia nigra of postmortem Parkinson's disease patients relative to age-matched controls, while glutathione levels in other parts of the brain remained unchanged.[1] Glutathione levels in the substantia nigra of patients with other neurodegenerative diseases involving the basal ganglia, such as Supranuclear Palsy and Multiple System Atrophy, were not altered, suggesting that lower glutathione levels in the substantia nigra is, in fact, a feature of Parkinson's disease and not necessarily of neurodegenerative disorders in general.

Because of glutathione's ability to protect the brain from oxidative stress-induced damage and because of the facts that glutathione levels are depleted early in the course of Parkinson's and the glutathione levels appear to be inversely related to disease severity, researchers hypothesized that glutathione may be an efficacious therapy in the treatment of Parkinson's disease. While studies regarding glutathione and Parkinson's are comparatively limited, we do have some data on the intranasal and intravenous routes of administration.

In a randomized, double-blind, placebo-controlled trial involving intranasal glutathione at two different dosages (100 mg and 200 mg) and a saline control, each administered three times per day for three months, all cohorts improved during the intervention period.[2] This included the placebo group. The 200 mg glutathione group did experience improvements in the total Unified PD Rating Scale (UPDRS) and UPDRS motor subscore over baseline, but neither treatment group was superior to placebo. Researchers concluded that larger studies that were longer in duration were necessary to elucidate whether or not intranasal glutathione is superior to placebo in the treatment of Parkinson's disease.

In an open-label, small-scale study where researchers administered 600 mg of intravenous glutathione twice daily for 30 days to early-stage, treatment-naïve Parkinson's patients, all nine of the patients improved during the course of the study with a 42% decline in disability.[3] These benefits lasted 2-4 months after discontinuation of the infusions.

Another study, a randomized, double-blind, placebo-controlled trial, administered 1400 mg of intravenous glutathione or placebo three times per week for four weeks to 20 individuals with Parkinson's disease. At the end of the study, the changes in UPDRS scores weren't significant, although the glutathione group did experience improvements in UPDRS ADL and motor subscores during the duration of the study. The glutathione group then saw a worsening of those scores in the 8 weeks directly following the study. Researchers noted that although the study results point to symptomatic effect with the administration of intravenous glutathione, larger studies are needed to draw more concrete conclusions.[4]

The differences in results between the two available studies on intravenous glutathione in the treatment of Parkinson's disease may be attributable to a variety of different factors, including the fact that one study was open label while the other was a randomized clinical trial and the differences in the degree of disease progression between participants in the two studies. The open-label, uncontrolled nature of the first study makes its results less reliable than the first, while it is also highly likely that the recently-diagnosed, treatment-naïve nature of the individuals in the first study led to a more exaggerated response to the therapy.

Researchers remarked that limited transport of glutathione across the blood brain barrier and into the substantia nigra could be a potential explanation for the limited efficacy seen with the administration of glutathione in a condition like Parkinson's which we know is associated with insufficient glutathione levels. Researchers are continually seeking to create forms of glutathione that would be transported more efficiently into the brain.[5]

Intravenous administration of glutathione was found to be safe. No participants withdrew from the study because of adverse effects, and reported adverse effects were similar to those reported in the placebo group.[4]

Reference List

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