

Millennium Health Centers Alert on the Emerging Science of COVID-19's Effects on the Brain and Nervous System

A Non-Traumatic Brain Injury Called Viral Encephalopathy

ENCINO, Calif., May 18, 2020 (Newswire.com) - It was just a matter of time before the anticipated reports started appearing about the neurological impact of COVID-19 on the brain of those individuals who recovered after infection. Those who have been following the work of Millennium Health Centers' Dr. Mark L. Gordon, on traumatic and non-traumatic brain injuries, understood that there was a potential risk between having survived a coronavirus infection and subsequently developing a neurological or neuropsychiatric illness. This is the non-traumatic form of brain injury precipitated by a viral infection that induces a massive release of inflammatory cytokines referred to as a "cytokine storm" or autoimmune encephalitis.

Dr. Jennifer Frontera, a neurologist at NYU Langone Brooklyn Hospital, is seeing coronavirus patients with impact on their brain and nervous system. Some of the cases have documented seizures in COVID-19 patients with no prior history of epilepsy, as well as "unique" new patterns of tiny brain hemorrhages. In some cases, significant damage to the white matter of the brain is seen, causing varied degrees of disruption in brain functioning.

A study published in the *Journal of the American Medical Association* (JAMA 3(2) 2020) found 36.4 percent of 214 Chinese patients had neurological symptoms ranging from loss of smell and nerve pain, to seizures and large vessel strokes. A paper in the *New England Journal of Medicine* that examined 58 patients in Strasbourg, France, found that more than half were confused or agitated, with brain imaging suggesting inflammation.

"We are seeing a lot of patients presenting in confusional states," said Dr. Rohan Arora, a neurologist at the Long Island Jewish Forest Hills Hospital, adding that more than 40 percent of recovered COVID-19 patients exhibit altered levels of consciousness.

As in veterans exposed to a spectrum of battle injuries, sports professionals, and civilians living and enjoying life to the fullest, there are moments of injury that are negated because they did not cause loss of consciousness, amnesia, or nausea/vomiting. However, they did initiate a process of neuroinflammation, as COVID-19 is doing so well.

Neuroinflammation can be transient (acute), being associated with or without short-term neurological, cognitive, and neurobehavioral disorders, or prolonged with chronic devastating symptomatology. As long as there is inflammation, there are cytokines.

The Mechanisms of Damage

There are three major pathways that a virus such as COVID-19 can take that leads to neurological involvement of the brain with alterations in psychological, physiological, and physical functioning. The first is the response of the body's immune system directed against the invading coronavirus. As has been seen in the elderly, those with a compromised immune system, diabetes, multiple medical conditions and medication, there is a hyperbolic response of the immune system, leading to a "cytokine storm" throughout the body, with the greatest impact initially on the respiratory system.

It is a rapid process in many compromised individuals, moderate in some, mild in others, and in the fortunate, without a missed beat. As the ability of the lungs to take in oxygen and expel carbon dioxide fails, a condition known as hypoxia looms.

As hypoxia worsens, the lack of oxygen in the brain causes a loss of fractalkine, a chemokine that lowers the brain's production of cytokines from the immune cells of the brain – Microglial cells. Loss of fractalkine allows for brain derived cytokines to be released in another "cytokine storm."

A second pathway is derived from damage to the blood brain barrier (BBB) that protects the brain from products or infections circulating below the neck. Disruption of the BBB by the presence of elevating levels of cytokines produced below the neck, along with those being produced by the glial cells of the brain, allows for the passage of COVID-19 into the brain to initiate a viral encephalopathy.

The third pathway is a cumulative effect of cytokines on the molecular chemistry of the brain. Neuroinflammation leads to elevation in oxidative stress (ROS/RNS), causing a rise in the level of oxidative stress (oxidative load), which impedes the normal biochemical processes required for cell-to-cell communication. This can be clinically observed as a change in level of consciousness, cognition and neuropsychobehavior.

As demonstrated by these three key pathways, they overlap in their ability to create a non-neuropermissive environment, leading to the loss of neurons and brain functioning. If left unchecked, the ultimate effect of COVID-19 on those surviving will be a population of individuals with diminished mental and physical capacity to live independently and without medication, a scenario seen frequently with our veteran heroes.

Treatment

The Millennium-TBI Project has been addressing the neuroinflammation generated by traumatic and non-traumatic injuries with nutraceutical products such as eicosanoids, tocopherols, NAC, melatonin, quercetin and EGCG. All these products demonstrate an ability to lower the production of inflammatory cytokines (NF-kB) while protecting neurons and their supportive glial cells from oxidative stress and increased cytokine damage.

To learn more visit www.dhpUSA.com and www.TBIHelpNow.org

About Dr. Mark L. Gordon

Dr. Mark L. Gordon is the founder and medical director of Millennium Health Centers, Inc. in Encino, California. In 2015, Dr. Gordon released the book, "Traumatic Brain Injury - A Clinical Approach to Diagnosis and Treatment" that presents the science and his experience treating all precipitating causes of traumatic brain injury in both active military, veteran, sports, and civilian populations. Dr. Gordon has also joined with the [Warrior Angels Foundation](http://www.WarriorAngelsFoundation.org), a 501(c)(3) charitable organization founded by veterans Andrew and Adam Marr to provide services to members of the armed forces both active and veterans. For more information, visit www.TBIHelpNow.org.

Source: Millennium Health Centers, Inc

About Millennium Health Centers, Inc

Over the past 22 years, the Millennium has developed treatment protocols for traumatic brain injury precipitated Post-Traumatic Stress Syndromes.

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