

The Newest Brain Syndrome Related to COVID-19

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There is a vast number of viruses that live among us, some of them are innocuous to humans while others can cause mild to severe damage to our bodies. This subset of viruses usually has a predilection to a given tissue or organ but COVID-19-others refer it as Sars-CoV-2, has an affinity to respiratory airways leading to mild to severe breathing insufficiency, dry-cough, fever and some cases even coma and death. Recently, many neurologists and neurointensivists have raised their concern regarding the neurological deficits found in cases positive to COVID-19, directing several researchers and doctors to believe that this virus might be the culprit, because there is much data like CSF (Cerebrospinal fluid) and post-mortem biopsy of brain tissue positive to COVID-19 in such patients. This behavior in viruses is well known in other clinical settings like herpes virus infection, ADEM, HIV and Guillain-Barre syndrome. Moreover, this kind of property is coined "neurotropism". And like chickenpox virus herpes-zoster infection this virus could as well shows Lazarus-like behavior. The chickenpox virus Herpes zoster, for example, commonly infects the nerve cells in the spine, later reappearing in adulthood as shingles - roughly 30% of people who experienced chickenpox in childhood will develop shingles at some point in their lives.

The first COVID-19 case known was found in Wuhan, China in December 2019. It was established that patient "zero" was infected at an alive-wild-animal shop, where the current pandemic began. Furthermore, it is thought that the vector of infection was from an infected bat. At this moment, the whole world is being affected by it, while in countless countries the first wave of infection is settling down in others it is just beginning, and certain experts are discussing the possibility of a second wave, since not everybody has been immunized (no current vaccine) and other recovered patients have lost their antibodies against it and somehow this might be a reasonable explanation about why there are recurrent cases.

It is paramount to cover the fact that usually viruses, like influenza, impacts the population in an U-shape mortality curve, meaning that children and elderly are the most involved, but this is not the case for COVID-19, for the reason that toddlers are not that much stricken that any other etary group. Additionally, the amount of patient being admitted to ICU are mostly men, 70%, although men and female have been affected at equal rate. It is well mention that roughly 50% of the infected patients will develop symptoms and from these, the main group at risk is elderly patients, as much as 14% might eventually die, but having comorbidities like heavy smokers, asthma, diabetes, bed-ridden condition and so on, might increase this rate substantially, whereas having blood group O+ might act as protection to some extent.

It is well considered the respiratory issues related to COVID-19, but the neurological ones not that much. This is taking place since many mild cases complaining of mild headache or confusion refused to visit a doctor out of afraidness, they presume by going to the hospital they might get infected as well, therefore there is under registration of such cases. Moreover, in innumerable ICUs, many doctors do not consider agitation, seizure, confusion and stupor as neurological symptoms (they assume is related to drugs, for instance) related to COVID-19, while others ICUs, neurologist and neurointensivists have noted this trend and have raised this issue to be taken seriously.

Now, since in numerous countries it is banned to do postmortem biopsy, by chance in Italy was found in a postmortem brain biopsy COVID-19 material inside the brain tissue and in China numerous alive infected patients whose CFS sample were positive to COVID-19 material as well, pointing to deduce there is a link between this virus as the offender of brain disease.

Currently, there are various theories mentioned by the scientific community regarding how the COVID-19 disease damages the brain tissue. It is worth naming all the neurological symptoms related to this disease:

- Confusion
- Loss of consciousness
- Seizures
- Stroke
- Loss of smell and taste
- Headaches
- Trouble focusing
- Changes in behavior.

This virus is not only an on-steroids-version of the common cold virus but also shows several quirky, unusual and sometimes terrifying features. The first theory is that since there is respiratory insufficiency leading to an O₂ saturation of less than 85% even as low as 70% (which could lead to death) some patients experiment “Happy Hypoxia” yet remain neurologically intact.

The second thesis might explain why some patient between 30 - 40 years old are witnessing more brain strokes than the general population, it is speculated that since the endothelial tissue is more active in such age group then they are more prone to suffer coagulopathies.

Another hypothesis is that an inflammatory cascade created by the cytokine-storm could set forward a byproduct of the body’s inflammatory response damaging the brain tissue and blood-brain-barrier.

And lastly, the supposition supported by the knowledge that the olfactory nerve is adjacent to the nose roof, thus render it leaner to be infected directly by the virus heading to loss of smell and taste.

While unfortunately multiple symptoms might improve over time, for instance, general weakness, headaches, confusion others might not have the same fate as the loss of smell and taste. Still this emergent disease requires further investigation and surveillance to fully comprehend it.

It is imperative to mention that in order to elucidate all this evidence, cooperation between healthcare centers around the globe as well as virologists, researchers and physicians will be needed and an immense research to enclose it in the years to come.

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