Original Article: A Review of the Effect of Corona on the Human Brain – Short Review

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ABSTRACT

Infection with the corona virus leads to short-term and long-term effects, which sometimes affect the sufferers for the rest of their lives. The effect of Corona on the human brain has been studied by many scientists. The new symptoms that have been observed in patients suffering from the disease of Covid-19 indicate the effect of the corona virus on the functioning of the human brain and nervous system. While examining and treating patients in New York, which is considered to be the most prominent state in America in terms of infection with the corona virus and the number of victims of the Covid-19 disease, apart from fever, cough, body pain and shortness of breath, new signs of the destructive effect of the corona virus on human health. They found that the brain and nervous system of the patients are also somehow involved in this disease. Among the characteristics of this new finding is confusion, forgetfulness and even convulsions caused by nervous pressure in patients with Covid-19, many cases of which have been observed in New York state; In such a way that some patients do not even know where they are and why they are in the hospital or what year we are in now. In most cases, these symptoms are related to the lack of oxygen in the blood; However, it has been observed that this memory disorder in some patients is not very proportional due to the level of pulmonary involvement with the virus. "Jennifer Frontera", a neurologist at Langone University Hospital in Brooklyn, one of the old parts of New York City, believes that according to the new findings, the issue of involvement of the brain and nervous system when contracting the new type of corona virus is now seriously discussed in it has been investigated.

Introduction

British neuroscientists have found that the SARS-COV-2 virus can cause serious damage to the human brain and nervous system, including stroke, paralysis and memory loss, which is usually diagnosed too late. Now it is clear that corona disease can damage many other organs in addition to the lungs and respiratory system, including the heart, veins, nerves, kidneys and skin.

But the neurologists of the University College London (UCL) have reached other shocking results in their research, which show that the Covid-19 virus has caused serious brain damage in some patients, even those who had

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very mild symptoms and recovered. Injuries that are either diagnosed too late or never. Recently, scientists have reached findings regarding the reduction of IQ or intelligence quotient of people who get infected with Covid-19, which we will discuss in this article.

They diagnosed acute encephalomyelitis in nine out of 43 patients with Covid-19. This inflammatory disease leads to the destruction of the central nervous system, which affects the myelin sheath (the sheath surrounding nerve fibers) of the nerves of the brain and spinal cord, and is considered a serious disease of the nervous system with widespread damage to the brain and spinal cord.

Among the tested patients, 12 suffered from inflammation of the central nervous system, 10 from temporary encephalopathy (a type of brain disease) with delusions or psychosis, eight from stroke, and another eight from peripheral nerve problems. Most of them are diagnosed with Guillain-Barré syndrome.

Guillain-Barre syndrome is a disorder that causes the body's immune system to attack the nerves, which results in paralysis and in five percent of cases it is fatal. A 59-year-old woman infected with Covid-19 died as a result of this complication. Michael Zandi, director of this research project and a consultant at University College London Hospital, says: "We have not seen such an attack method in other viruses."

According to him, it is completely unusual that such serious injuries are inflicted even on patients who have had very mild symptoms of the disease. According to this research, Corona causes long-term physical and brain damage in many patients.

They are short of breath and tired even long after recovery. Other people who have recovered suffer from numbness, weakness and memory loss. "Biologically, acute encephalomyelitis has similarities to multiple sclerosis (MS), but is more severe and usually occurs only once," says Michael Zandi. Some patients suffer from these complications for a long time and some recover well.

Michael Zandi emphasizes that the goal of their team is to make specialists and doctors all over the world aware of this part of the complications of Corona. They should definitely pay special attention to the symptoms that the patient has in terms of memory problems, fatigue, numbness or weakness, and if they see these symptoms in the patient, they should definitely consult a neurologist.

In these investigations, sometimes the fate of people is published, which is shocking. For example, a 47-year-old woman who came to the hospital after a week with cough and fever, headache and numbness in her right hand, suddenly became very drowsy and stopped reacting to her surroundings. He had to undergo emergency surgery and part of his skull had to be removed to relieve pressure on his swollen brain.

Another 55-year-old patient, who did not have any mental problems before contracting Corona, behaves strangely the day after being discharged from the hospital. He is constantly putting on and taking off his clothes. After some time, he starts having hallucinations and sees monkeys and lions in his house. After returning to the hospital, he is given psychiatric drugs. British neurologists say it is possible that the corona disease causes subtle brain damage in some patients that only becomes apparent years later.

According to the study, similar late effects occurred after the Spanish flu outbreak in 1918, and up to one million people may have suffered brain damage at that time. In a recent study conducted in the United Kingdom, the brain scan image of hundreds of people before and after being infected with Corona was analyzed, and the results are as follows:

- In the first stage, studies showed that Covid-19 can have important and harmful effects on the human brain; Of course, it is not yet clear whether these effects can lead to long-term cognitive impairment or not.
- Inability to concentrate, brain disorder, excessive fatigue and impaired sense of smell and taste have been observed in most patients.

- The researchers found that the effect of the corona virus is more visible in the limbic and olfactory cortex systems. Also, these brain changes can lead to dementia (which generally occurs in old age) in corona sufferers.

According to a new study conducted by the University of Cambridge and Imperial London, acute corona infection may cause cognitive impairment equivalent to 20 years of aging.

Also, this infection can lead to cognitive problems and disorder in the mental health of sufferers in the long term. A study published in the journal eClinicalMedicine showed that acute corona patients after recovery have cognitive impairments similar to aging that people in their 50s and 70s experience.

The researchers found that these disorders are more severe in people who have used oxygen and artificial respiration devices. According to David Menon, a professor at Cambridge University, cognitive problems include a wide range of neurological disorders, including dementia or premature aging; But the footprint of Covid-19 on the brain is completely different from other cognitive disorders. The study was conducted on July 31, 2021 among a number of people aged 28 to 83 years. This study showed that cognitive disorders for severe Covid-19 patients sometimes continue even after six months and the recovery process of patients is slow. These long-term effects of Corona are called long-term Covid-19.

According to the researchers, the results suggest that patients who recover from severe coronavirus infection may need long-term care for cognitive deficits. Many studies show that people who get severe corona can experience a wide range of mental illnesses and long-term cognitive impairments after recovery.

Depression, anxiety, brain fog, fatigue and other mental disorders are among them. A study on 740 people who had no history of mental problems and memory disorders was conducted by Icahn University of Medicine. The results of this research showed that some patients still had high brain fog after 7 months. Also, previous studies have shown that the probability of long-term symptoms of Covid-19 in unvaccinated people is higher than in vaccinated people.

An imaging study has shown the mild effects of Covid-19 on the brain by examining scans of hundreds of people taken before and after viral infection. This research shows that the impact of Covid-19 on the brain is important and harmful; But it is still unclear whether these brain changes lead to long-term cognitive deficits or not.

From lack of concentration, brain dysfunction and fatigue to impaired taste and smell and the neurological effects of Covid-19 are well known. The new study, published in the journal Nature, presents a unique set of data from an ongoing project that examines the health of half a million people. UK Participant reviews. The researchers focused on data from 401 people, and brain imaging was done before and after a positive case of Covid-19.

The second brain scan for each person was performed an average of 141 days after the initial diagnosis of Covid-19. The researchers wrote in the new study: "The impact of the coronavirus can be seen mainly in the limbic and olfactory cortical systems.

For example, by changes in diffusion measures, which are examples of tissue damage, in functionally related regions of the piriform cortex, olfactory tubercle, and anterior olfactory nucleus, as well as more pronounced reductions in gray matter thickness and contrast in SARS-CoV-2-infected participants. It has been observed in the left par hippocampal gyrus and the lateral orbitofrontal cortex. Researchers confirm the possibility that virus-induced brain changes could trigger or accelerate age-related dementia after a new imaging study. Currently, it is not known what effect vaccination has on these brain changes. Sara Halol, a researcher from Curtin University, said in this regard: The observed brain changes were relatively small and at the group level. So not all had the same effects. More research is needed to know whether these changes persist over time, reverse or worsen, and whether there are treatments that can help.

Decreased IQ in acute corona patients

Unfortunately, the number of complications of the corona virus is increasing every day, and researchers are finding out more about the complications of the corona virus through investigations. The research team from the University of Cambridge and Imperial London found that people who suffer from acute corona virus will probably face a 10-point reduction in IQ or intelligence quotient. Of course, this effect can also appear in people who are infected with mild corona virus. It was said that Covid-19 can cause permanent cognitive and mental health problems and affect the affected person for months.

Things that affect the human brain and intelligence lead to problems such as the inability to remember words, sleep disorders, and post-traumatic stress disorder (PTSD). A study was conducted in the UK on 46 hospitalized patients.

During this research, on an average of six months after people are infected, various aspects of mental abilities such as memory, attention and reasoning are measured and subjected to detailed computer tests.

The results of this study were surprising; Those who recovered from the disease had less accuracy, less ability to concentrate, and slower reaction to the surrounding events. The studied subjects were also weak in verbal reasoning. Researchers have considered the problem of finding words common among sufferers.

They also showed slower processing speed and significantly reduced attention, problem solving and short-term memory. Considering the fact that not much time has passed since the spread of Corona in the world and the end of Corona may be near, it cannot be said for sure that these diseases and complications will be permanent and will be with the person for the rest of his life, but we can consider the possibility of this hypothesis. He knew to some extent that it was true.

Brain fog disorder; One of the symptoms of Corona

Brain fog disorder is one of the early symptoms of corona disease, which may even remain in a person for a long time after the recovery stage. Brain fog is not actually a disease; Rather, it is a term used for a group of symptoms such as memory loss, inability to concentrate, difficulty processing information, fatigue, and scattered thoughts. Since the beginning of the spread of the corona disease, the "brain fog" disorder has been among the complications that have been talked about. Apart from Covid-19, many other disorders and conditions such as anxiety can cause brain fog that will resolve itself after some time.

Lack of concentration and reduced thinking power

Lack of concentration is a common symptom of brain fog disorder, which has been reported in about 30% of corona patients. In this situation, a person may have difficulty concentrating on the simplest tasks; Even if he tries to concentrate on a task, he may find it difficult to focus his thoughts and finish the task with utmost care.

When the brain tissue is affected by corona disease and other diseases, the power of thinking may slow down and it takes 30 or 40 minutes to do a task that used to be completed in 10 minutes.

Brain fog disorder may also affect a person's speaking and writing skills. People with this disorder may have trouble finding the right word to use in a sentence. Lack of concentration and reduced thinking power can make it difficult for a person to do several things at the same time. He may even feel tired after doing a simple task or the level of efficiency and performance of the person will decrease.

Delirium of mental disorder after contracting severe corona

Researchers at the University of Michigan found that delirium is one of the common consequences of Covid-19 in patients hospitalized and even after recovery from the disease and discharge from the hospital, the delirium may not be completely cured. According to Science, this research was conducted with the help of 150 patients with Covid-19 who were admitted to the hospital during the pandemic, and it was found that 73% of these patients were delirious.

Delirium is a serious mental disorder that causes confusion, confusion and inability of the patient to think correctly. The researchers tried to identify the factors influencing delirium through interviews with volunteer patients after discharge from the hospital and also by examining their medical records.

Destruction of brain neurons

A mild corona infection probably does not cause serious brain complications, and in other words, brain and neurological complications probably do not occur in all people, and most of the people admitted to the hospital and those suffering from the acute and severe form of the disease experience these complications and disorders; Of course, in this category of patients, the reports vary between 20 and 50 percent. The information that has been obtained about the neurological and brain effects of the corona virus is not complete and we are at the beginning of knowing the effects of the corona virus on the brain and nervous system, but based on what has been obtained, the corona virus can damage the nervous system to a very mild degree in addition to lung damage. to get involved and cause complications.

According to the conducted research, Corona is effective in the occurrence of some neurological diseases such as encephalopathy, stroke, encephalitis and neurological autoimmune diseases such as Guillain Barre syndrome after infection.

Viral encephalopathy causes symptoms such as delirium, confusion, drowsiness, impaired awareness of time and place, reduced cognitive abilities, memory impairment, and even rarely symptoms similar to insanity in the patient. It is possible that the corona virus can damage the brain and nervous system. create lasting effects; Because if the brain and brain neurons are damaged and destroyed, there is no possibility of its restoration and reconstruction. Of course, sometimes with some treatments, the function of the damaged part can be improved to some extent, but the neurons are not regenerated, and this issue can make the effects of Covid-19 disease last.

Conclusion

According to studies, the coronavirus can enter the nervous tissue through ACE2 and cause neurological symptoms. Although the prevalence of neurological manifestations is lower than respiratory complications in corona patients, neurological manifestations such as stroke can occur during the course of the disease or as one of the complications of corona disease. Studies show that strokes have been linked to Covid-19 as a result of increased blood clotting, and even young people with no previous risk factors for stroke have experienced blood clots in the arteries of the brain. If you experience changes in your mental, emotional, psychological, and personality functioning that are usually accompanied by behavioral changes, you may have encephalopathy.

This rare complication usually occurs with viral infections, but the cause is not the virus itself, but the excessive release of soluble proteins called "cytokines". This protein is actually the body's warning signal about a virus attack, but sometimes it is released too much and causes inflammation. Scientists are still not sure if the same thing happens with the coronavirus or if the virus directly targets the nervous system.

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