Review Article

Plasma Therapy: A possible treatment for corona virus?

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ABSTRACT

This is not the first-time convalescent plasma therapy is being considered as a treatment for viral infections.

1. In 2014, the World Health Organization (WHO) had recommended the use of convalescent plasma therapy to treat patients with the antibody-rich plasma of those who had recovered from the **Ebola virus disease.**
2. For the treatment of people infected with **Middle East respiratory syndrome (MERS)**, which is also caused by a coronavirus, a protocol for use of convalescent plasma was established in 2015.
3. During the 1918 **H1N1 influenza virus (Spanish flu)** pandemic, the therapy was used experimentally.
4. The plasma therapy was used as a treatment during the **H1N1 infection of 2009**.

Others serious outbreaks that have seen the use of this therapy are the **SARS outbreak**, **Measles**, **HIV**, **polio** and **mumps**.

Before telling about plasma therapy, let me introduce you about antigen-antibody reaction. when any agent cause infection antibodies come into action to fight against agent, if antibodies win agent can't harm our body but if blood don't have antibodies against that agent, infection occurs in body. While the world's governments and the World Health Organization (WHO) urgently look at medical treatments that could actively fight the corona virus infection, some countries are looking at something called convalescent plasma therapy to treat those infected with the virus.

Plasma is the often-forgotten component in blood: It is the liquid part of blood, making up 55 percent of its overall content. When isolated on its own, blood plasma is a light-yellow liquid, similar to the color of straw. Along with water, plasma carries salts and enzymes.

The primary purpose of plasma is to transport nutrients, hormones and proteins to the parts of the body that need it. Cells also deposit their waste products into the plasma and the plasma, in turn, helps remove this waste from the body. Blood plasma also ushers the movement of all the elements of blood through the circulatory system.

Scientists and researchers are exploring various avenues to come up with medical treatments that can fight the novel corona virus. One such treatment that's in focus right now is Convalescent Plasma Therapy. Here, we explain what the convalescent plasma therapy is, the benefits and risks involved.

Convalescent Plasma Therapy is an experimental procedure to treat COVID 19 infection. In this treatment method, plasma from a COVID patient who has fully recovered is transfused into a corona virus patient with critical condition.

This therapy's concept is simple and is based on the premise that the blood of a patient who has recovered from Covid-19 contains antibodies with the specific ability of fighting novel corona virus. The theory is that the recovered patient's antibodies, once ingested into somebody under treatment, will begin targeting and fighting the novel corona virus in the second patient.

The convalescent plasma therapy is akin to passive immunization as, according to researchers, it is a preventive measure and not a treatment for the Covid-19 disease.

After China and the US, India has given a go ahead for framing a protocol to conduct a clinical trial for convalescent plasma therapy. The therapy has been used experimentally in the past and so has become a ray of hope in the fight against the novel corona virus pandemic.

How Convalescent Plasma Therapy Works?

The convalescent plasma therapy uses antibodies developed within an infected person while he/she is infected with the novel corona virus.

These antibodies are developed in a patient as part of the body's natural immune response to a foreign pathogen or in this case, the novel corona virus. These antibodies are highly specific to the invading pathogen and so, work to eliminate the novel corona virus from the patient's body.

Once the patient has recovered, they donate their blood so that their antibodies can be used to treat other patients. The donated blood is then checked for the presence of any other disease-causing agents such as Hepatitis B, Hepatitis C, HIV etc.

If deemed safe, the blood is then taken through a process to extract 'plasma', the liquid part of the

blood that contains antibodies. The antibody-rich plasma, once extracted, is then ingested into the body of a patient under treatment.

Speaking about the process the plasma therapy involves, John Hopkins University immunologist Arturo Casadevall, who is spearheading a project to use the therapy, has said, "The concept is simple. Patients who recover from an infectious disease often produce antibodies that can protect against later infections with the same microbe. This immunity can be transferred by giving serum to those at risk of infection."

Risks Involved

Besides speaking about the success of the convalescent plasma therapy, the study by John Hopkins immunologists stated some of the risks associated with it:

1. Transfer Of Blood Substances: As the blood transfusion takes place, there are risks that an inadvertent infection might get transferred to the patient.

2. Enhancement of infection: The therapy might fail for some patients and can result in an enhanced form of the infection.

3. Effect on immune system: The antibody administration may end up suppressing the body's natural immune response, leaving a Covid-19 patient vulnerable to subsequent re-infection.

Plasma Therapy and Covid-19

Plasma therapy's potential as treatment for Covid-19 has already been explored in limited trial in China, where the outbreak first emerged. In one trial, 10 critically-ill Covid-19 patients were subject to convalescent plasma therapy. The trial showed some improvement in patients' condition.

"No severe adverse effects were observed. This study showed CP [convalescent plasma] therapy was well tolerated and could potentially improve the clinical outcomes through neutralizing viremia [the presence of viruses in the blood] in severe Covid-19 cases," the researchers who conducted the trial said.

Another trial conducted by researchers in Shenzhen, China treated five critically-ill Covid-19 patients with the plasma therapy and found "improvement in [their] clinical status".

Ray of Hope

These studies have sparked a ray of hope. However, researchers caution that it's too early to think of plasma therapy as an effective treatment. For example, the sample sizes in the Covid-19 plasma therapy trials are too small to arrive at definite conclusions.

According to a **report published in Mayo Clinic's Research Magazine,** the researchers across the world have also raised the point that there are too many unknowns right now. For instance, what is the optimal dose of antibodies? At what point during a patient's illness should treatment be given? Which patients will benefit? These are some that need to be addressed before reaching concrete conclusions.