



CONVALESCENT PLASMA AS POTENTIAL THERAPY FOR RECENTLY EMERGED NOVEL CoVID-19

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INTRODUCTION

Plasma Therapy concept is one of the oldest technique developed by a physiologist Emil Adolf Behring for diphtheria in animal studies. He found that immunity to diphtheria could be produced by the injection into animals of diphtheria toxin neutralized by diphtheria antitoxin. His serum therapy is worked as a victorious weapon against diphtheria infection, for which he awarded Nobel price in 1901(1-2). This therapy showed positive results in Spanish Flu Out break(1-2). Till now, there is no specific treatment has been proven to be effective for SARS-CoV-2 infection. Patients were managed with supportive care, such as oxygen supply in mild cases and extracorporeal membrane oxygenation for the critically ill patients, specific drugs for this disease are still being researched. Although few drugs like remdesivir and chloroquine are highly effective in the control of 2019-nCoV infection (3), there is no clear evidence about their action in majority of the population. Many research centers were trying to develop vaccine. But as Mortality rate is raising day by day across the globe, we need some treatment to neutralize SARSCoV-2. So Hopefully Plasma Therapy serves as an victorious weapon against CoVID-19.

Plasma is the component of the blood that contains the virus fighting antibodies. For convalescent therapy is extracted from the blood of recovered covid-19 patients and given to people severely ill with the disease and it helps severely ill patients fight the infection by reinforcing their immune system.

CONVALESCENT PLASMA (CP) THERAPY

Convalescent plasma therapy is a adaptive immuno-therapy and it was used for prevention and treatment of various infectious diseases such as SARS, MERS in 2009 H1N1 pandemic(4,5). The Meta-analysis of several studies of SARS coronavirus infection and severe influenza like Spanish influenza A(H1N1), avian influenza A(H5N1) had revealed that there was an significant reduction in mortality, especially when convalescent plasma is administered early after symptom onset(6). As CoVID-19 is a SARS corona infection and till now we dont have any Significant Treatment approach, So Convalescent Plasma therapy might be a treatment option for COVID-19 rescue. Patients who have recovered from COVID-19 with a high neutralizing antibody titer maybe a valuable donor source of Convalescent Plasma. the potential clinical benefit and risk of convalescent blood products in COVID-19 remains uncertain. Convalescent plasma or immunoglobulins have been used as a last resort to improve the survival rate of patients with SARS whose condition continued to deteriorate despite treatment with pulsed methylprednisolone (7,8). Most importantly, the current guidelines emphasise that systematic corticosteroids should not be given routinely for the treatment of COVID-19, which was also the recommendation in a a Commnt in The Lancet (9). Moreover, several studies showed a shorter hospital stay and lower mortality in patients treated with convalescent plasma than those who were not treated with convalescent plasma (10). Recent studies were explained, patients with fever, cough, shortness of breath, and chest pain, disappear or largely improved within 1 to 3 days and few patients were removal from mechanical ventilation to high-flow



nasal cannula, discontinued high-flow nasal cannula upon Convalescent plasma transfusion.

Plasma transfusion from recovered COVID-19 patients, lowered the severity of disease by raising lymphocyte counts, improving liver and lung function, and reducing inflammation, which is the sign of infection.

Donors for Convalescent Plasma Transfusion (11)

Donor patients who recovered from COVID-19. The recovery criteria were as follows:

- 1) Normality of body temperature for more than 3 days.
 - 2) Resolution of respiratory tract symptoms.
 - 3) Two consecutively negative results of sputum SARS-CoV-2 by RT-PCR assay (1-day sampling interval).
- The donor's blood was collected after 3 weeks post onset of illness and 4th day post discharge.

Neutralizing activity of CP against SARS-CoV-2

The neutralizing activity against SARS-CoV-2 was evaluated by classical plaque reduction test using a isolated viral strain (12). A small sample study in MERS-CoV infection showed that the neutralizing antibody titer should exceed 1:80 to achieve effective CP therapy (The pilot clinical trial using CP in severe patients showed that among the first batch of CP samples from 40 recovered COVID-19 patients, 39 showed high antibody titers of at least 1:160 whereas only one had a antibody titer of 1:32 (13).

Adverse reactions with CP therapy:

In pilot CP therapy study on COVID-19, No serious adverse reactions were found after CP transfusion, But one patient developed evanescent facial red (13).

Quantity of Plasma required for CP therapy

One dose of 200ml CP transfusion (11) was well tolerated, and while the clinical symptoms significantly improved with the increase of oxy-hemoglobin saturation within 3 days, accompanied by rapid neutralisation of virus in the blood. In present study these all investigated patients achieved serum COVID-19 negativity after CP transfusion, accompanied by an increase of oxygen saturation and lymphocyte count, improvement of liver function tests and CRP. The results suggested that inflammation and over reaction of the immune system were decreased by antibody containing in CP.

Conflict of interest: Nil

CONCLUSION

Management of COVID-19 has mainly focused on infection prevention, case detection and monitoring, and supportive care. However, no specific anti-SARS-CoV-2 treatment is recommended because of the absence of evidence.

Evidence shows that convalescent plasma from patients who have recovered from viral infections can be used as a treatment without the occurrence of severe adverse events. Therefore, it might be worthwhile to test the safety and efficacy of convalescent plasma transfusion in SARS-CoV-2-infected patients.

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