

## Review Article

# Impact of convalescent plasma therapy for treatment of Covid-19

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**Abstract.** Coronavirus SARS-CoV-2 is a leading cause of public health emergencies, particularly, has only few literatures have summarized its clinical and radiologic pattern, however the treatment strategies are confined, whilst it is not just medical, economic and social but also has documented emphasis. Furthermore, the former Chinese guideline has highlighted that convalescent plasma (CP) therapy was a promising treatment for alarming Covid-19. CP is a pattern of passive immunization. Usually, CP was notoriously used to enhance the survival speed in a diverse outbreak such as SARS, MERS, influenza, Ebola virus disease, etc. It predominantly acts by neutralizing antibodies that significantly bind to the specific antigens of SARS-CoV therein protecting the susceptibility of individuals, moreover, urgently needed to reduce the immediate health hazard in this Covid-19 pandemic scenario. On the other hand, CP therapy is predominantly efficacious at the initial stage of disease ultimately confirmed by various research literature. This short review highlights on the use, historical context and its benefits in treatment of Covid-19.

**Keywords:** Coronavirus, immunization, pandemic, emergencies, convalescent plasma

### Introduction

In ancient times Emil Adolf Behring, a physiologist expanded the theory of plasma therapy anticipated to be an older method which was primarily used to treat diphtheria in animal literature thereby achieving a Nobel prize for this serum therapy. Ultimately leading to control of Spanish Flu Outbreak [1, 2].

The worldwide pandemic of a novel human coronavirus, recently termed as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) by the international committee on taxonomy of viruses, unprecedentedly led to declaration of global threat of emergency worldwide by World Health organization (WHO). Moreover, this virus was gradually recognized in Wuhan, China, in December 2019 [3-4]. Not long ago, it has infected approximately 210 countries and nearly 2.1 million of population across the globe [5]. In the meantime, it is a part of Coronaviridae family, associated within the subfamily Orthocoronavirinae and lastly belongs to order Nidovirales. Additionally, circumvented the incident of SARS in 2002 and MERS in 2012 has significantly addressed that these viruses has the potential to get across the deterrent species thereby infecting human being with unpredictable fatality [6].

Currently, no particular treatment displayed positive results attributable to SARS-CoV-2 condition. However, those patients were managed typically through supportive care, whereas those with critical illness were managed by oxygen supply, and extracorporeal membrane oxygenation.

Currently various drugs such as chloroquine, remdesivir are researched underway in order to develop those drugs which are detrimentally effective against SARS-CoV -2 infection [7, 8]. Furthermore, in the present context there is insufficient literature data which is thought to be uncertain and scarce irrespective of evolution of new drugs constituting Covid-19, notably restricted data from China, Spain, Italy, United States of America, Germany, France, United Kingdom, and other international registries. Further remains a bottleneck and an obstacle in predicting new outcomes [9].

### Development of passive immunization

Passive immunotherapy (PI) is a newer procedure that is detrimentally effective across the infective pathogens by specifically initiating the pathogen-specific antibodies to subjects. Moreover, these pathogens block its interaction with a cell receptor, which is exceptionally appropriate in the manifestation of viral antigens that ultimately expedite the adjunct to the target receptors. Finally, the subject is exposed to the viral infection, therein producing antibodies against the virus. Henceforth these antibodies are recovered as convalescent plasma (CP), wherein transfusion of antibodies led to the neutralization of pathogen, presumably boosting the immunity.

### Convalescent plasma therapy

CP is an adaptive immune therapy prior to the severe

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acute respiratory syndrome coronavirus (SARS-CoV-2,) it was predominantly found to treat various forms of viral sepsis wherein revealed positive results, thereby comprising of avian influenza A (H5N1) virus, and influenza A (H1N1) pdm09 virus, Middle East Respiratory Syndrome (MERS)-CoV epidemic, and the Ebola epidemic [10-13]. On the other hand, only few studies have depicted the benefit of CP in Covid-19 patients. Shen and colleagues outlined a case series of 5 critically ill subjects all receiving convalescent plasma including SARS-CoV-2 antibodies (titre > 1:1000). Consequently after transfusion, 4 out of 5 Subjects exhibited an upsurge rise in viral antibody titres, presumably reducing the SARS-CoV-2 viral loads, and therefore resulting in normalizing of temperature and considerably causing resolution of acute respiratory distress syndrome (ARDS) [14]. Furthermore, Convalescent Plasma therapy might be relevantly used as rescue therapy, whilst primarily obtained from a patient who had recently recuperated from Covid-19 infection, those with increase neutralizing antibody titre, wherein successfully act as a precious donor defence of CP. Even though exhibit various benefits its use remains uncertain [15-16].

### Potential risks and benefits

Convalescent sera potentially avail for either prevention of infectious disease or for disease management. Additionally, used prophylactically in those who are vulnerable subjects, healthcare providers, those with underlying disease conditions concurrently those who are exposed to affirmed cases of covid-19 [17]. In contrast, passive antibody is particularly used in high-risk infants for the prophylaxis of respiratory syncytial virus. Another probable benefit is the likelihood that the antibodies obtained from plasma could play a predominant aspect in the suppression of viremia. In addition, a *in vivo* trial exhibited that the outcome of 3BNC117-mediated therapy for HIV-1 induced stimulation of infected cell clearance, ultimately causing clearance of free viral particles and intrusion of newest disease [18]. Henceforth, administering convalescent plasma ought to be efficacious primarily at the initial phase of infection. However, more studies are underway which are essentially needed in order to demonstrate the influence of this method wherein linked to numerous parameters therein despite numerous challenges it might produce a potential output [19-21].

### Donors for transfusion of convalescent plasma

For disposition of convalescent sera administration, subsequently six set of contexts are required: (i) accessibility of a population of donors who have been successfully recovered from the infection and can characteristically donate convalescent serum; (ii) blood banking provisions to undertake the serum donations; (iii) availability of assays, those constituting serological assays, to discover SARS-CoV-2 in serum and biological assays to measure viral neutralization; (iv) virology laboratory support to perform these assays; (v) prophylaxis and therapeutic protocols; (vi) regulatory compliance, including institutional review board approval, which might differ constraining on environment [22].

### Adverse drug reactions with CP therapy

In one study named as pilot CP therapy which was conducted on Covid-19, no significant serious adverse reactions were reported after transfusion of CP. However, one subject manifested evanescent facial red [23].

### Conclusion

Currently, Covid -19 epidemic is one of the major third outbreak that occurred in 21<sup>st</sup> century, wherein imposes a global public threat to all countries across the world. In the dearth of looming issue where numerous treatment regimens have been investigated, wherein no specific promising results have been obtained, unfortunately, no antivirals have been available. Moreover, there is predominant renewed interest that use of passive immunotherapy by means of transfusion of convalescent plasma obtained from recovered subjects has recorded by the innumerable trials from the view of clinical perspective issued every day. Henceforth, data from previous results although limited, elucidated that the use of serum is a therapeutic short term approach that can be used effectively particularly at an early stage of the disease, also with convalescent plasma in the frame of absence of definitive protocols.

### Conflict of Interest

The author declares no conflict of interest.

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